WHAT IS CLAIMED IS:

1. A method for forming at least one opening in a geological formation, comprising:

forming a portion of an opening in the formation;

providing an acoustic wave to at least a portion of the formation, wherein the acoustic wave is configured to propagate between at least one geological discontinuity of the formation and at least a portion of the opening;

sensing at least one reflection of the acoustic wave in at least a portion of the opening;

using the sensed reflection to assess an approximate location of at least a portion of the opening in the formation; and

forming an additional portion of the opening based on, at least in part, the assessed approximate location of at least a portion of the opening.

2. The method of claim 1, further comprising using the sensed reflection to maintain an approximate desired location of the opening between an overburden of the formation and an underburden of the formation.

3. The method of claim 1, wherein at least one geological discontinuity comprises a boundary of the formation.

4. The method of claim 1, further comprising using the sensed reflection to maintain the location of the opening at approximately midway between an overburden of the formation and an underburden of the formation.

5. The method of claim 1, further comprising producing the acoustic wave using a monopole source or a dipole source.

6. The method of claim 1, further comprising sensing the reflection of the acoustic wave using one or more sensors in at least a portion of the opening.

7. The method of claim 1, further comprising producing the acoustic wave using a source for producing the acoustic wave in at least a portion of the opening.

8. The method of claim 1, further comprising producing the acoustic wave using a source for producing the acoustic wave in at least a portion of the opening, and sensing the acoustic wave using one or more sensors in at least a portion of the opening.

9. The method of claim 1, further comprising sensing the reflection of the acoustic wave during formation of at least a portion of the opening in the formation.

10. The method of claim 1, further comprising using a calculated or assessed acoustic velocity in the formation when using the sensed reflection to assess the location of the opening in the formation.

11. The method of claim 1, further comprising propagating an acoustic wave between an overburden of the formation and the opening.

12. The method of claim 1, further comprising propagating an acoustic wave between an underburden of the formation and the opening.

13. The method of claim 1, further comprising propagating an acoustic wave between an overburden of the formation and the opening, and an underburden of the formation and the opening.

14. The method of claim 1, further comprising using information from the sensed acoustic wave to, at least in part, guide a drilling system in forming the opening.

15. The method of claim 1, further comprising substantially simultaneously providing acoustic waves, sensing reflected acoustic waves, and using information from the sensed acoustic waves to, at least in part, guide a drilling system in forming the opening.

16. The method of claim 1, further comprising using information from the sensed acoustic wave to, at least in part, substantially simultaneously guide a drilling system in forming the opening.

17. The method of claim 1, further comprising using information from the sensed acoustic wave to assess a location of at least a part of the opening, and then using such assessed location to, at least in part, guide a drilling system in forming the opening.

18. The method of claim 1, further comprising using information from the sensed acoustic waves to assess locations of parts of the opening, and then using such assessed locations to, at least in part, guide a drilling system in forming the opening.

19. The method of claim 1, wherein a first opening is formed using the sensed acoustic wave, and further comprising forming one or more additional openings by using magnetic tracking to form at least one of the additional openings at a selected approximate distance from the first opening.

20. The method of claim 1, further comprising assessing an approximate orientation of the opening with an inclinometer.

21. The method of claim 1, further comprising assessing an approximate location of the opening relative to a second opening in the formation by detecting one or more magnetic fields produced from the second opening.

22. The method of claim 1, further comprising assessing an approximate location of the opening relative to a second opening in the formation by detecting one or more magnetic fields produced from the second opening with a magnetometer.

23. The method of claim 1, further comprising assessing an approximate location of the opening relative to a second opening in the formation by detecting one or more magnetic fields

produced from the second opening so that the opening is formed at an approximate desired distance from the second opening.

24. The method of claim 1, wherein at least a portion of the formation comprises hydrocarbons, the method further comprising heating at least a portion of the formation and pyrolyzing at least some hydrocarbons in the formation.

25. The method of claim 1, further comprising heating at least a portion of the formation, and controlling a pressure and a temperature in at least a part of the formation, wherein the pressure is controlled as a function of temperature, and/or the temperature is controlled as a function of pressure.

26. The method of claim 1, further comprising heating at least a portion of the formation, and producing a mixture from the formation, wherein the produced mixture comprises condensable hydrocarbons having an API gravity of at least about 25°.

27. The method of claim 1, further comprising heating at least a portion of the formation, controlling a pressure in at least a part of the formation, wherein the controlled pressure is at least about 2.0 bars absolute.

28. The method of claim 1, further comprising heating at least a portion of the formation, and controlling formation conditions such that a mixture produced from the formation comprises a partial pressure of H_2 in the mixture greater than about 0.5 bars.

29. The method of claim 1, further comprising heating at least a portion of the formation, and altering a pressure in the formation to inhibit production of hydrocarbons from the formation having carbon numbers greater than about 25.

30. The method of claim 1, further comprising heating at least a portion of the formation to a minimum pyrolysis temperature of about 270 °C.

31. A method for heating a hydrocarbon containing formation, comprising:

providing heat to the formation from one or more heaters in one or more openings in the formation, wherein at least one of the openings has been formed by:

forming a portion of an opening in the formation;

providing an acoustic wave to at least a portion of the formation, wherein the acoustic wave is configured to propagate between at least one geological discontinuity of the formation and at least a portion of the opening;

sensing at least one reflection of the acoustic wave in at least a portion of the opening; and

using the sensed reflection to assess an approximate location of at least a portion of the opening in the formation.

32. The method of claim 31, wherein at least one portion of an opening has been formed based on, at least in part, the assessed approximate location of at least a portion of the opening.

33. The method of claim 31, wherein at least one portion of an opening has been formed using the sensed reflection to maintain an approximate desired location of the opening between an overburden of the formation and an underburden of the formation.

34. The method of claim 31, wherein at least one geological discontinuity comprises a boundary of the formation.

35. The method of claim 31, wherein at least one portion of an opening has been formed based on, at least in part, using the sensed reflection to maintain the location of the opening at approximately midway between an overburden of the formation and an underburden of the formation.

36. The method of claim 31, wherein at least one portion of an opening has been formed based on, at least in part, producing the acoustic wave using a monopole source or a dipole source.

37. The method of claim 31, wherein at least one portion of an opening has been formed based on, at least in part, sensing the reflection of the acoustic wave using one or more sensors in at least a portion of the opening.

38. The method of claim 31, wherein at least one portion of an opening has been formed based on, at least in part, producing the acoustic wave using a source for producing the acoustic wave in at least a portion of the opening.

39. The method of claim 31, wherein at least one portion of an opening has been formed based on, at least in part, producing the acoustic wave using a source for producing the acoustic wave in at least a portion of the opening, and sensing the acoustic wave using one or more sensors in at least a portion of the opening.

40. The method of claim 31, wherein at least one portion of an opening has been formed based on, at least in part, sensing the reflection of the acoustic wave during formation of at least a portion of the opening in the formation.

41. The method of claim 31, wherein at least one portion of an opening has been formed based on, at least in part, using a calculated or assessed velocity in the formation when using the sensed reflection to assess the location of the opening in the formation.

42. The method of claim 31, wherein at least one portion of an opening has been formed based on, at least in part, propagating an acoustic wave between an overburden of the formation and the opening.

43. The method of claim 31, wherein at least one portion of an opening has been formed based on, at least in part, propagating an acoustic wave between an underburden of the formation and the opening.

44. The method of claim 31, wherein at least one portion of an opening has been formed based on, at least in part, propagating an acoustic wave between an overburden of the formation and the opening and an underburden of the formation and the opening.

45. The method of claim 31, wherein at least one portion of an opening has been formed based on, at least in part, using information from the sensed acoustic wave to, at least in part, guide a drilling system in forming the opening.

46. The method of claim 31, wherein at least one portion of an opening has been formed based on, at least in part, substantially simultaneously providing acoustic waves, sensing reflected acoustic waves, and using information from the sensed acoustic waves to, at least in part, guide a drilling system in forming the opening.

47. The method of claim 31, wherein at least one portion of an opening has been formed based on, at least in part, using information from the sensed acoustic wave to, at least in part, substantially simultaneously guide a drilling system in forming the opening.

48. The method of claim 31, wherein at least one portion of an opening has been formed based on, at least in part, using information from the sensed acoustic wave to assess a location of at least a part of the opening, and then using such assessed location to, at least in part, guide a drilling system in forming the opening.

49. The method of claim 31, wherein at least one portion of an opening has been formed based on, at least in part, using information from the sensed acoustic waves to assess locations of parts of the opening, and then using such assessed locations to, at least in part, guide a drilling system in forming the opening.

50. The method of claim 31, wherein at least one portion of an opening has been formed based on, at least in part, using the sensed acoustic wave, and further comprising forming one or more additional openings by using magnetic tracking to form one or more additional openings at a selected approximate distance from the first opening.

51. The method of claim 31, further comprising assessing an approximate orientation of the opening with an inclinometer.

52. The method of claim 31, further comprising assessing an approximate location of the opening relative to a second opening in the formation by detecting one or more magnetic fields produced from the second opening.

53. The method of claim 31, further comprising assessing an approximate location of the opening relative to a second opening in the formation by detecting one or more magnetic fields produced from the second opening with a magnetometer.

54. The method of claim 31, further comprising assessing an approximate location of the opening relative to a second opening in the formation by detecting one or more magnetic fields produced from the second opening so that the opening is formed at an approximate desired distance from the second opening.

55. The method of claim 31, further comprising pyrolyzing at least some hydrocarbons in the formation.

56. The method of claim 31, further comprising controlling a pressure and a temperature in at least a part of the formation, wherein the pressure is controlled as a function of temperature, and/or the temperature is controlled as a function of pressure.

57. The method of claim 31, further comprising producing a mixture from the formation, wherein the produced mixture comprises condensable hydrocarbons having an API gravity of at least about 25°.

58. The method of claim 31, further comprising controlling a pressure in at least a part of the formation, wherein the controlled pressure is at least about 2.0 bars absolute.

59. The method of claim 31, further comprising controlling formation conditions such that a produced mixture comprises a partial pressure of H_2 in the mixture greater than about 0.5 bars.

60. The method of claim 31, further comprising altering a pressure in the formation to inhibit production of hydrocarbons from the formation having carbon numbers greater than about 25.

61. The method of claim 31, further comprising heating at least a portion of the formation to a minimum pyrolysis temperature of about 270 °C.

62. A method of producing phenolic compounds from a hydrocarbon containing formation, comprising:

providing heat from one or more heaters to at least a portion of the formation;

allowing the heat to transfer from one or more of the heaters to a section of the formation;

producing formation fluids from the formation; and

controlling at least one condition in at least a portion of the formation to selectively produce phenolic compounds in the formation fluid, wherein controlling at least one condition comprises controlling production of hydrogen from the formation.

63. The method of claim 62, wherein controlling at least one condition comprises forming a perimeter barrier around a part of the section of the formation to define a treatment area before providing heat.

64. The method of claim 62, wherein controlling at least one condition comprises heating the section to a temperature greater than 260 °C.

65. The method of claim 62, further comprising separating the phenolic compounds from the produced formation fluids.

66. The method of claim 62, further comprising separating the phenolic compounds from the produced formation fluids, wherein the phenolic compounds comprise creosol compounds.

67. The method of claim 62, further comprising separating the phenolic compounds from the produced formation fluids, wherein the phenolic compounds comprise resorcinol compounds.

68. The method of claim 62, further comprising separating the phenolic compounds from the produced formation fluids, wherein the phenolic compounds comprise phenol.

69. The method of claim 62, wherein the mixture is produced from the formation when a partial pressure of hydrogen in at least a portion the formation is at least about 0.5 bars.

70. The method of claim 62, further comprising controlling the heating of the portion of the formation such that a temperature of a majority of the portion is less than about 375 °C.

71. The method of claim 62, wherein the formation fluids produced further comprise hydrocarbons having an average API gravity greater than about 25°.

72. A method of treating a hydrocarbon containing formation in situ, comprising:
providing heat from one or more heaters to at least a portion of the formation;
allowing the heat to transfer from one or more of the heaters to a section of the formation;
providing hydrogen to the section, wherein a flow rate of hydrogen is controlled as a function of an amount of hydrogen in a mixture produced from the formation; and
producing the mixture from the formation.

73. The method of claim 72, further comprising reducing an amount of the mixture produced from one or more production wells in the formation based on the amount of hydrogen produced from one or more of the production wells in the formation.

74. The method of claim 72, wherein the amount of hydrogen in the mixture produced from the formation is assessed by determining a partial pressure of the hydrogen in gases produced from one or more production wells.

75. The method of claim 74, wherein the partial pressure of the hydrogen in gases produced from one or more production wells is at least about 0.5 bars.

76. The method of claim 72, wherein the amount of hydrogen in the mixture produced from the formation is assessed by determining an initial pressure in the formation before providing hydrogen to the section, and wherein producing a mixture from the formation comprises producing the mixture when a pressure in the formation after hydrogen has been provided to the section decreases to approximately the initial pressure in the formation.

77. The method of claim 72, wherein the amount of hydrogen in the mixture produced from the formation is assessed by determining an increase in production of condensable hydrocarbons produced from the formation.

78. The method of claim 72, wherein producing a mixture from the formation comprises pumping the mixture with a submersible pump.

79. The method of claim 72, wherein the produced mixture comprises substantially condensable hydrocarbons.

80. The method of claim 72, wherein the produced mixture comprises phenols.

81. The method of claim 72, further comprising controlling heating of the portion of the formation such that a temperature of a majority of the portion is less than about 375 °C.

82. The method of claim 72, wherein the produced mixture comprises hydrocarbons having an average API gravity greater than about 25°.

83. A method of treating a hydrocarbon containing formation in situ, comprising:
providing heat from one or more heaters to at least a portion of the formation;
allowing the heat to transfer from one or more of the heaters to a section of the formation;
providing hydrogen to the section of the formation; and

controlling production of hydrogen from a plurality of production wells in the formation; wherein the production of hydrogen produced from one or more production wells is controlled by selectively and preferentially producing the mixture as a liquid from the formation.

84. The method of claim 83, wherein controlling hydrogen production from the formation comprises inhibiting production of gas from the formation.

85. The method of claim 83, wherein controlling hydrogen production from the formation comprises increasing production of condensable hydrocarbons from the formation.

86. The method of claim 83, wherein the mixture comprises condensable hydrocarbons, and wherein producing the mixture comprises pumping the mixture with a submersible pump.

87. The method of claim 83, further comprising controlling the heat provided to the formation such that a temperature of a majority of the section is less than about 375 °C.

88. The method of claim 83, wherein the produced mixture comprises hydrocarbons having an average API gravity greater than about 25°.

89. The method of claim 83, wherein the mixture is produced from the formation when a partial pressure of hydrogen in at least a portion the formation is at least about 0.5 bars.

90. The method of claim 83, wherein the produced mixture comprises phenols.

91. A method of treating a hydrocarbon containing formation in situ, comprising:

providing heat from one or more heaters to at least a portion of the formation;

allowing the heat to transfer from one or more of the heaters to a section of the formation;

providing a mixture of hydrogen and a carrier fluid to the section;

controlling production of hydrogen from the formation; and

producing formation fluid from the formation.

92. The method of claim 91, wherein the carrier fluid is nitrogen.

93. The method of claim 91, wherein the carrier fluid is methane.

94. The method of claim 91, wherein the carrier fluid is carbon dioxide.

95. The method of claim 91, wherein an amount of hydrogen in the mixture ranges from about 1 wt% to about 80 wt%.

96. The method of claim 91, wherein controlling hydrogen production from the formation comprises inhibiting production of gas from the formation.

97. The method of claim 91, wherein controlling hydrogen production from the formation comprises increasing production of condensable hydrocarbons from the formation.

98. The method of claim 91, wherein the produced formation fluid comprises condensable hydrocarbons and wherein producing the formation fluid comprises pumping the mixture with a submersible pump.

99. The method of claim 91, wherein the produced formation fluid comprises phenols.

100. The method of claim 91, wherein the mixture is produced from the formation when a partial pressure of hydrogen in at least a portion the formation is at least about 0.5 bars.

101. The method of claim 91, further comprising controlling the heating of the portion of the formation such that a temperature of a majority of the portion is less than about 375 °C.

102. The method of claim 91, wherein the formation fluid produced further comprises hydrocarbons having an average API gravity greater than about 25°.

103. A method of treating a hydrocarbon containing formation in situ, comprising;

forming a barrier around a treatment area of the formation to inhibit migration of fluids from the treatment area of the formation;

providing hydrogen to the treatment area;

providing heat from one or more heaters to the treatment area;

allowing the heat to transfer from one or more of the heaters to a section of the formation;

controlling production of hydrogen from the formation; and

producing a mixture from the formation.

104. The method of claim 103, wherein controlling the production of hydrogen from the formation comprises inhibiting gas production from the formation.

105. The method of claim 103, wherein controlling the production of hydrogen from the formation comprises increasing condensable hydrocarbons production from the formation.

106. The method of claim 103, wherein controlling the production of hydrogen from the formation comprises increasing condensable hydrocarbons production, and wherein producing the mixture comprises pumping the condensable hydrocarbons with a submersible pump.

107. The method of claim 103, wherein the produced mixture comprises condensable hydrocarbons.

108. The method of claim 103, wherein the produced mixture comprises phenols.

109. The method of claim 103, wherein the mixture is produced from the formation when a partial pressure of hydrogen in at least a portion the formation is at least about 0.5 bars.

110. The method of claim 103, further comprising controlling the heating of the portion of the formation such that a temperature of a majority of the portion is less than about 375 °C.

111. The method of claim 103, wherein the formation fluid produced further comprises hydrocarbons having an average API gravity greater than about 25°.

112. A method of treating a hydrocarbon containing formation in situ, comprising;

providing a refrigerant to a plurality of barrier wells surrounding a treatment area of the formation;

establishing a frozen barrier zone to inhibit migration of fluids from the treatment area of the formation;

providing hydrogen to the treatment area;

providing heat from one or more heaters to the treatment area;

allowing the heat to transfer from one or more of the heaters to a section of the formation;

controlling production of hydrogen from the section; and

producing a mixture from the formation.

113. The method of claim 112, wherein controlling hydrogen production from the formation comprises inhibiting gas production from the formation.

114. The method of claim 112, wherein controlling hydrogen production from the formation comprises increasing production of condensable hydrocarbons from the formation.

115. The method of claim 112, wherein controlling hydrogen production from the formation comprises increasing production of condensable hydrocarbons, and wherein producing the mixture comprises pumping the condensable hydrocarbons with a submersible pump.

116. The method of claim 112, wherein the produced mixture comprises substantially condensable hydrocarbons.

117. The method of claim 112, wherein the produced mixture comprises phenols.

118. The method of claim 112, wherein the mixture is produced from the formation when a partial pressure of hydrogen in at least a portion the formation is at least about 0.5 bars.

119. The method of claim 112, further comprising controlling the heating of the portion of the formation such that a temperature of a majority of the portion is less than about 375 °C.

120. The method of claim 112, wherein the formation fluid produced further comprises hydrocarbons having an average API gravity greater than about 25°.

121. A method for treating a hydrocarbon containing formation, comprising:

providing heat from one or more heaters to at least a portion of the formation, wherein at least one of the heaters is in at least one wellbore in the formation, and wherein at least one of the wellbores has been sized, at least in part, based on a determination of expansion of the formation caused by heating of the formation such that expansion of the formation caused by heating of the formation is not sufficient to cause substantial deformation of one or more heaters in such sized wellbores, and wherein a ratio of an outside diameter of the heater to an inside diameter of the wellbore is less than about 0.75;

allowing the heat to transfer from the one or more heaters to a part of the formation; and

producing a mixture from the formation.

122. The method of claim 121, wherein at least one of the wellbores comprises an open wellbore.

123. The method of claim 121, wherein the ratio of the outside diameter of the heater to the inside diameter of the wellbore is less than about 0.5.

124. The method of claim 121, wherein the ratio of the outside diameter of the heater to the inside diameter of the wellbore is less than about 0.3.

125. The method of claim 121, further comprising controlling the heating to maintain a minimum space between at least one of the heaters and the formation in at least one of the wellbores.

126. The method of claim 121, further comprising controlling the heating using a temperature limited heater.

127. The method of claim 121, further comprising controlling the heating to maintain a minimum space of at least about 0.25 cm between at least one of the heaters and the formation in at least one wellbore.

128. The method of claim 121, wherein a diameter of one or more of the sized wellbores is greater than or equal to about 30 cm.

129. The method of claim 121, wherein one or more of the wellbores have an expanded diameter proximate to relatively rich zones in the formation.

130. The method of claim 129, wherein one or more of the expanded diameters is greater than or equal to about 30 cm.

131. The method of claim 129, wherein the relatively rich zones comprise a richness greater than about 0.15 L/kg.

132. The method of claim 129, wherein the relatively rich zones comprise a richness greater than about 0.17 L/kg.

133. The method of claim 121, further comprising adjusting a heat output of at least one of the heaters such that the heat output provided to relatively rich zones of the formation is less than the heat output provided to other zones of the formation.

134. The method of claim 133, wherein the relatively rich zones comprise a richness greater than about 0.15 L/kg.

135. The method of claim 121, further comprising adjusting a heat output of at least one of the heaters such that the heat output provided to relatively rich zones of the formation is less than about ½ the heat output provided to other zones of the formation.

136. The method of claim 121, further comprising reaming at least one of the wellbores after at least some heating of the formation from such wellbores.

137. The method of claim 121, further comprising reaming at least one of the wellbores after at least some heating of the formation from such wellbores, and wherein the reaming is conducted to remove at least some hydrocarbon material that has expanded in such wellbores.

138. The method of claim 121, further comprising removing at least one of the heaters from at least one of the wellbores, and then reaming at least one such wellbore.

139. The method of claim 121, further comprising perforating one or more relatively rich zones in at least part of the formation to allow for expansion of at least one or more of the relatively rich zones during heating of the formation.

140. The method of claim 121, further comprising placing a liner in at least one of the wellbores, between at least a part of one of the heaters and the formation, wherein the liner inhibits heater deformation caused by thermal expansion of the formation during heating.

141. The method of claim 140, wherein the liner comprises a mechanical strength sufficient to inhibit collapsing of the liner proximate relatively rich zones of the formation.

142. The method of claim 140, wherein the liner comprises one or more openings to allow fluids to flow through the wellbore in which the liner is placed.

143. The method of claim 140, wherein a ratio of an outside diameter of the liner to the inside diameter of the wellbore in which the liner is placed is less than about 0.75.

144. The method of claim 140, wherein a ratio of an outside diameter of the liner to the inside diameter of the wellbore in which the liner is placed is less than about 0.5.

145. The method of claim 140, wherein a ratio of an outside diameter of the liner to the inside diameter of the wellbore in which the liner is placed is less than about 0.3.

146. The method of claim 121, further comprising maintaining a temperature in at least a portion of the formation in a pyrolysis temperature range, with a lower pyrolysis temperature of about 250 °C and an upper pyrolysis temperature of about 400 °C.

147. The method of claim 121, further comprising heating at least a part of the formation to substantially pyrolyze at least some hydrocarbons in the formation.

148. The method of claim 121, further comprising controlling a pressure and a temperature in at least a part of the formation, wherein the pressure is controlled as a function of temperature, or the temperature is controlled as a function of pressure.

149. The method of claim 121, wherein allowing the heat to transfer from the one or more heaters to the part of the formation comprises transferring heat substantially by conduction.

150. The method of claim 121, wherein the produced mixture comprises condensable hydrocarbons having an API gravity of at least about 25°.

151. The method of claim 121, further comprising controlling a pressure in at least a majority of a part of the formation, wherein the controlled pressure is at least about 2.0 bars absolute.

152. The method of claim 121, further comprising controlling formation conditions such that the produced mixture comprises a partial pressure of H_2 in the mixture greater than about 0.5 bars.

153. The method of claim 121, wherein the formation comprises an oil shale formation.

154. The method of claim 121, wherein the formation comprises a coal formation.

155. A method for treating a hydrocarbon containing formation, comprising:

providing heat from one or more heaters to at least a portion of the formation, wherein at least one of the heaters is in at least one of one or more wellbores in the formation, and wherein heating from one or more of the heaters is controlled to inhibit substantial deformation of one or more of the heaters caused by thermal expansion of the formation against such one or more heaters;

allowing the heat to transfer from the one or more heaters to a part of the formation; and producing a mixture from the formation.

156. The method of claim 155, wherein at least one of the wellbores comprises an uncased wellbore.

157. The method of claim 155, further comprising controlling the heating to maintain a minimum space between at least one of the heaters and the formation in at least one of the wellbores.

158. The method of claim 155, further comprising controlling the heating using a temperature limited heater.

159. The method of claim 155, further comprising controlling the heating to maintain a minimum space of at least about 0.25 cm between at least one of the heaters and the formation in at least one of the wellbores.

160. The method of claim 155, wherein at least one of the heaters is in at least one of the wellbores having a diameter sufficient to inhibit the formation from expanding against such heater during heating of the formation.

161. The method of claim 160, wherein the diameter of at least one of the wellbores having a diameter sufficient to inhibit the formation from expanding against such heater during the heating of the formation is greater than or equal to about 30 cm.

162. The method of claim 155, wherein one or more of the wellbores have an expanded diameter proximate to relatively rich zones in the formation.

163. The method of claim 162, wherein the expanded diameter is greater than or equal to about 30 cm.

164. The method of claim 162, wherein the relatively rich zones comprise a richness greater than about 0.15 L/kg.

165. The method of claim 162, wherein the relatively rich zones comprise a richness greater than about 0.17 L/kg.

166. The method of claim 155, wherein controlling the heating comprises adjusting a heat output of at least one of the heaters such that the heat output provided to relatively rich zones of the formation is less than the heat output provided to other zones of the formation.

167. The method of claim 155, wherein controlling the heating comprises adjusting a heat output of at least one of the heaters such that about the heat output provided to relatively rich zones of the formation is less than about ½ the heat output provided to other zones of the formation.

168. The method of claim 167, wherein the relatively rich zones comprise a richness greater than about 0.15 L/kg.

169. The method of claim 155, further comprising reaming at least one of the wellbores after at least some heating of the formation from such wellbores.

170. The method of claim 155, further comprising reaming at least one of the wellbores after at least some heating of the formation from such wellbores, and wherein the reaming is conducted to remove at least some hydrocarbon material that has expanded in such wellbores.

171. The method of claim 155, further comprising removing at least one of the heaters from at least one of the wellbores, and then reaming at least one such wellbore.

172. The method of claim 155, further comprising perforating one or more relatively rich zones in at least part of the formation to allow for expansion of at least one or more of the relatively rich zones during heating of the formation.

173. The method of claim 155, further comprising placing a liner in at least one of the wellbores and between at least a part of one of the heaters and the formation, wherein the liner inhibits heater deformation caused by thermal expansion of the formation during heating.

174. The method of claim 173, wherein the liner comprises a mechanical strength sufficient to inhibit collapsing of the liner proximate relatively rich zones of the formation.

175. The method of claim 173, wherein the liner comprises one or more openings to allow fluids to flow through the wellbore in which the liner is placed.

176. The method of claim 173, wherein a ratio of an outside diameter of the liner to the inside diameter of the wellbore in which the liner is placed is less than 0.75.

177. The method of claim 173, wherein a ratio of an outside diameter of the liner to the inside diameter of the wellbore in which the liner is placed is less than 0.5.

178. The method of claim 173, wherein a ratio of an outside diameter of the liner to the inside diameter of the wellbore in which the liner is placed is less than 0.3.

179. The method of claim 155, further comprising maintaining a temperature in at least a portion of the formation in a pyrolysis temperature range with a lower pyrolysis temperature of about 250 °C and an upper pyrolysis temperature of about 400 °C.

180. The method of claim 155, further comprising heating at least a part of the formation to substantially pyrolyze at least some hydrocarbons in the formation.

181. The method of claim 155, further comprising controlling a pressure and a temperature in at least a part of the formation, wherein the pressure is controlled as a function of temperature, or the temperature is controlled as a function of pressure.

182. The method of claim 155, wherein allowing the heat to transfer from the one or more heaters to the part of the formation comprises transferring heat substantially by conduction.

183. The method of claim 155, wherein the produced mixture comprises condensable hydrocarbons having an API gravity of at least about 25°.

184. The method of claim 155, further comprising controlling a pressure in at least a majority of a part of the formation, wherein the controlled pressure is at least about 2.0 bars absolute.

185. The method of claim 155, further comprising controlling formation conditions such that the produced mixture comprises a partial pressure of H_2 in the mixture greater than about 0.5 bars.

186. The method of claim 155, wherein the formation comprises an oil shale formation.

187. The method of claim 155, wherein the formation comprises a coal formation.

188. A system configured to heat at least a part of a hydrocarbon containing formation, comprising:

an elongated heater located in an opening in the formation, wherein at least a portion of the formation has a richness of at least about 30 gallons of hydrocarbons per ton of formation, as measured by Fischer Assay, and wherein the heater is configured to provide heat to at least a part of the formation during use such that at least a part of the formation is heated to at least about 250 °C; and

wherein an initial diameter of the opening is at least 1.5 times the largest transverse cross-sectional dimension of the heater in the opening and proximate the part of the formation being heated such that it inhibits the formation from deforming the heater due to expansion of the formation caused by heating of the formation.

189. The system of claim 188, wherein the initial diameter of the opening is at least about 2 times the largest transverse cross-sectional dimension of the heater in the opening.

190. The system of claim 188, wherein the initial diameter of the opening is sufficiently large enough to inhibit the formation from deforming the heater during heating of the formation.

191. The system of claim 188, wherein the initial diameter of the opening is sufficiently large enough to inhibit the formation from seizing the heater during heating of the formation.

192. The system of claim 188, wherein the initial diameter of the opening is sufficiently large enough to inhibit the formation from damaging the heater during heating of the formation.

193. The system of claim 188, wherein the initial diameter of the opening is sufficiently large enough to inhibit the formation from compressing the heater during heating of the formation.

194. The system of claim 188, wherein the initial diameter of the opening is at least 3 times the largest transverse cross-sectional dimension of the heater in the opening.

195. The system of claim 188, wherein the initial diameter of the opening is at least 4 times the largest transverse cross-sectional dimension of the heater in the opening.

196. The system of claim 188, wherein the system is configured to pyrolyze at least some hydrocarbons in the formation during use.

197. The system of claim 188, wherein the initial diameter of the opening is approximately a size of a drillbit used to form the opening.

198. The system of claim 188, wherein the heater comprises a ferromagnetic material.

199. The system of claim 188, wherein the heater comprises a temperature limited heater.

200. The system of claim 188, wherein the opening comprises an uncased wellbore.

201. The system of claim 188, wherein the heater is located in at least a portion of a deformation resistant container.

202. The system of claim 201, wherein the initial diameter of the opening is sufficiently large enough to inhibit the formation from deforming the deformation resistant container during heating of the formation.

203. The system of claim 188, wherein the initial diameter of the opening is at least 2 times the largest transverse cross-sectional dimension of the heater in the opening and proximate a part of the formation that comprises a richness of at least about 0.12 L/kg.

204. The system of claim 188, wherein the formation comprises an oil shale formation.

205. The system of claim 188, wherein the formation comprises a coal formation.

206. A method for treating a hydrocarbon containing formation, comprising:

heating a first volume of the formation using a first set of heaters; and

heating a second volume of the formation using a second set of heaters, wherein the first volume is spaced apart from the second volume by a third volume of the formation, and wherein

the first volume, the second volume, and the third volume are sized, shaped, and/or located to inhibit deformation of subsurface equipment caused by geomechanical motion of the formation during heating.

207. The method of claim 206, further comprising allowing the heat to transfer from the first volume and the second volume of the formation to at least a part of the formation.

208. The method of claim 206, wherein a footprint of the first volume, the second volume, or the third volume is sized, shaped, or located to inhibit deformation of subsurface equipment caused by geomechanical motion of the formation during heating.

209. The method of claim 206, further comprising sizing, shaping, or locating the first volume, second volume, or third volume to inhibit deformation of subsurface equipment caused by geomechanical motion of the formation during heating.

210. The method of claim 206, further comprising calculating geomechanical motion in a footprint of the first volume or the second volume, and using the calculated geomechanical motion to size, shape, or locate the first volume, the second volume, or the third volume.

211. The method of claim 206, further comprising allowing the heat to transfer from the first volume and the second volume of the formation to at least a part of the formation, and producing a mixture from the formation.

212. The method of claim 206, wherein the third volume substantially surrounds the first volume, and the second volume substantially surrounds the first volume.

213. The method of claim 206, wherein the third volume substantially surrounds all or a portion of the first volume, and the second volume substantially surrounds all or a portion of the third volume.

214. The method of claim 206, wherein the third volume has a footprint that is a linear, curved, or irregular shaped strip.

215. The method of claim 206, wherein the first volume and the second volume comprise rectangular footprints.

216. The method of claim 206, wherein the first volume and the second volume comprise square footprints.

217. The method of claim 206, wherein the first volume and the second volume comprise circular footprints.

218. The method of claim 206, wherein the first volume and the second volume comprise footprints in a concentric ring pattern.

219. The method of claim 206, wherein the first volume, the second volume, and the third volume comprise rectangular footprints.

220. The method of claim 206, wherein the first volume, the second volume, and the third volume comprise square footprints.

221. The method of claim 206, wherein the first volume, the second volume, and the third volume comprise circular footprints.

222. The method of claim 206, wherein the first volume, the second volume, and the third volume comprise footprints in a concentric ring pattern.

223. The method of claim 206, wherein the first volume, the second volume, or the third volume are sized, shaped, or located based on, at least in part, a calculated geomechanical motion of at least a portion of the formation.

224. The method of claim 206, further comprising sizing, shaping, or locating the first volume, the second volume, or the third volume based on, at least in part, a calculated geomechanical motion of at least a portion of the formation.

225. The method of claim 206, wherein the first volume, the second volume, or the third volume are sized, shaped, or located, at least in part, to inhibit deformation, caused by geomechanical motion of one or more selected wellbores in the formation.

226. The method of claim 206, wherein the first volume, the second volume, or the third volume are at least in part sized, shaped, or located based on a calculated geomechanical motion of at least a portion of the formation, and wherein the first volume, the second volume, or the third volume are sized, shaped, or located, at least in part, to inhibit deformation, caused by geomechanical motion, of one or more selected wellbores in the formation.

227. The method of claim 206, wherein the first volume, the second volume, or the third volume of the formation have been sized, shaped, or located, at least in part, based on a simulation.

228. The method of claim 206, wherein the first volume, the second volume, and the third volume of the formation have been sized, shaped, or located, at least in part, based on a simulation.

229. The method of claim 206, wherein a footprint area of the first volume, the second volume, or the third volume is less than about 400 square meters.

230. The method of claim 206, further comprising heating with a third set of heaters after a selected amount of geomechanical motion in the first volume or the second volume.

231. The method of claim 206, further comprising heating with a third set of heaters to maintain or enhance a production rate of a mixture from the formation.

232. The method of claim 206, further comprising maintaining a temperature in at least a portion of the formation in a pyrolysis temperature range with a lower pyrolysis temperature of about 250 °C and an upper pyrolysis temperature of about 400 °C.

233. The method of claim 206, further comprising pyrolyzing at least some hydrocarbons in the formation.

234. The method of claim 206, further comprising controlling a pressure and a temperature in at least a part of the formation, wherein the pressure is controlled as a function of temperature, or the temperature is controlled as a function of pressure.

235. The method of claim 206, further comprising producing a mixture from the formation.

236. The method of claim 235, wherein the produced mixture comprises condensable hydrocarbons having an API gravity of at least about 25°.

237. The method of claim 235, further comprising controlling formation conditions such that the produced mixture comprises a partial pressure of H_2 in the mixture greater than about 0.5 bars.

238. The method of claim 206, further comprising controlling a pressure in at least a part of the formation, wherein the controlled pressure is at least about 2.0 bars absolute.

239. The method of claim 206, wherein the formation comprises an oil shale formation.

240. The method of claim 206, wherein the formation comprises a coal formation.

241. A method for treating a hydrocarbon containing formation, comprising:

heating a first volume of the formation using a first set of heaters;

heating a second volume of the formation using a second set of heaters, wherein the first volume is spaced apart from the second volume by a third volume of the formation;

heating the third volume using a third set of heaters, wherein the third set of heaters begins heating at a selected time after the first set of heaters and the second set of heaters;

allowing the heat to transfer from the first volume, the second volume, and the third volume of the formation to at least a part of the formation; and

producing a mixture from the formation.

242. The method of claim 241, wherein the first volume, the second volume, or the third volume are sized, shaped, or located based on, at least in part, a calculated geomechanical motion of at least a portion of the formation.

243. The method of claim 241, further comprising sizing, shaping, or locating the first volume, the second volume, or the third volume based on, at least in part, a calculated geomechanical motion of at least a portion of the formation.

244. The method of claim 241, wherein the first volume, the second volume, or the third volume are sized, shaped, or located, at least in part, to inhibit deformation, caused by geomechanical motion, of one or more selected wellbores in the formation.

245. The method of claim 241, wherein the first volume, the second volume, or the third volume are at least in part sized, shaped, or located based on a calculated geomechanical motion of at least a portion of the formation, and wherein the first volume, the second volume, or the third volume are sized, shaped, or located, at least in part, to inhibit deformation caused by geomechanical motion of one or more selected wellbores in the formation.

246. The method of claim 241, wherein the first volume, the second volume, or the third volume of the formation has been sized, shaped, or located, at least in part, based on a simulation.

247. The method of claim 241, wherein the first volume, the second volume, and the third volume of the formation have been sized, shaped, or located, at least in part, based on a simulation.

248. The method of claim 241, wherein a footprint area of the first volume, the second volume, or the third volume is less than about 400 square meters.

249. The method of claim 241, wherein the third set of heaters begins heating after a selected amount of geomechanical motion in the first volume or the second volume.

250. The method of claim 241, wherein the third set of heaters begins heating to maintain or enhance a production rate of the mixture from the formation.

251. The method of claim 241, wherein the selected time has been at least in part determined using a simulation.

252. The method of claim 241, wherein the first volume and the second volume comprise rectangular footprints.

253. The method of claim 241, wherein the first volume and the second volume comprise square footprints.

254. The method of claim 241, wherein the first volume and the second volume comprise circular footprints.

255. The method of claim 241, wherein the first volume, the second volume, and the third volume comprise rectangular footprints.

256. The method of claim 241, wherein the first volume, the second volume, and the third volume comprise square footprints.

257. The method of claim 241, wherein the first volume, the second volume, and the third volume comprise circular footprints.

258. The method of claim 241, wherein the first volume, the second volume, and the third volume comprise footprints in a concentric ring pattern.

259. The method of claim 241, further comprising maintaining a temperature in at least a portion of the formation in a pyrolysis temperature range with a lower pyrolysis temperature of about 250 °C and an upper pyrolysis temperature of about 400 °C.

260. The method of claim 241, further comprising pyrolyzing at least some of the hydrocarbons in the formation.

261. The method of claim 241, further comprising controlling a pressure and a temperature in at least a majority of the part of the formation, wherein the pressure is controlled as a function of temperature, or the temperature is controlled as a function of pressure.

262. The method of claim 241, wherein the produced mixture comprises condensable hydrocarbons having an API gravity of at least about 25°.

263. The method of claim 241, further comprising controlling a pressure in at least a majority of a part of the formation, wherein the controlled pressure is at least about 2.0 bars absolute.

264. The method of claim 241, further comprising controlling formation conditions such that the produced mixture comprises a partial pressure of H_2 in the mixture greater than about 0.5 bars.

265. The method of claim 241, wherein the third set of heaters begins heating about 6 months after the first set of heaters or the second set of heaters begins heating.

266. The method of claim 241, wherein the formation comprises an oil shale formation.

267. The method of claim 241, wherein the formation comprises a coal formation.

268. A system configured to heat at least a part of a subsurface formation, comprising:

an AC power supply;

one or more electrical conductors configured to be electrically coupled to the AC power supply and placed in an opening in the formation, wherein at least one of the electrical conductors comprises a heater section, the heater section comprising an electrically resistive ferromagnetic material configured to provide an electrically resistive heat output when AC is applied to the ferromagnetic material, and wherein the heater section is configured to provide a reduced amount of heat near or above a selected temperature during use due to the decreasing AC resistance of the heater section when the temperature of the ferromagnetic material is near or above the selected temperature; and

wherein the system is configured to allow heat to transfer from the heater section to a part of the formation.

269. The system of claim 268, wherein the heater section automatically provides a reduced amount of heat above or near the selected temperature.

270. The system of claim 268, wherein at least a portion of the heater section is positionable adjacent to an overburden of the formation to heat at least a part of the overburden to inhibit condensation of vapors in a wellbore passing through the overburden.

271. The system of claim 268, wherein at least a portion of the heater section is positionable adjacent to hydrocarbon material in the formation to raise a temperature of at least some of the hydrocarbon material to or above a pyrolysis temperature.

272. The system of claim 268, wherein the subsurface formation comprises a hydrocarbon containing formation, and wherein the system is configured to pyrolyze at least some hydrocarbons in the formation.

273. The system of claim 268, wherein the subsurface formation comprises contaminated soil, and wherein the system is configured to decontaminate at least a portion of the contaminated soil.

274. The system of claim 268, wherein the system comprises three or more electrical conductors, and wherein at least three of the electrical conductors are configured to be electrically connected in a three-phase configuration.

275. The system of claim 268, wherein the heater section is configured to provide the reduced amount of heat without controlled adjustment of the AC.

276. The system of claim 268, wherein the heater section is configured to exhibit an increase in operating temperature of less than about 1.5 °C above or near a selected operating temperature when a thermal load proximate the heater section decreases by about 1 watt per meter.

277. The system of claim 268, further comprising an oxidation heater placed in the opening in the formation.

278. The system of claim 277, wherein the oxidation heater comprises a natural distributed combustor.

279. The system of claim 277, wherein the oxidation heater comprises a flameless distributed combustor.

280. The system of claim 277, wherein at least one of the electrical conductors is configured to provide heat to initiate an oxidation reaction in the oxidation heater during use.

281. The system of claim 277, wherein the selected temperature is above an initiation temperature for an oxidation reaction to commence in the oxidation heater, and wherein the selected temperature is below an operating temperature of the oxidation heater during use.

282. The system of claim 268, further comprising a highly electrically conductive material coupled to at least a portion of the ferromagnetic material of an electrical conductor, wherein AC applied to the electrical conductor substantially flows through the ferromagnetic conductor when

a temperature of the ferromagnetic conductor is below the selected temperature, and wherein the AC applied to the conductor is configured to flow through the highly electrically conductive material when the temperature of the ferromagnetic conductor is near or above the selected temperature.

283. The system of claim 268, wherein the ferromagnetic material comprises an elongated material, wherein the system further comprises an elongated highly electrically conductive material, and wherein at least about 50% of the elongated material is electrically coupled to the elongated highly electrically conductive material.

284. The system of claim 268, wherein at least one of the electrical conductors is configured to provide a reduced amount of heat above or near the selected temperature that is about 20% or less of the heat output at about 50 °C below the selected temperature.

285. The system of claim 268, wherein the heater section is configured such that the decreased AC resistance through the heater section above or near the selected temperature is about 20% or less than the AC resistance at about 50 °C below the selected temperature.

286. The system of claim 268, wherein the AC resistance of the heater section above or near the selected temperature is about 80% or less of the AC resistance at about 50 °C below the selected temperature.

287. The system of claim 268, wherein the AC resistance of the heater section decreases above the selected temperature to provide the reduced amount of heat.

288. The system of claim 268, wherein the heater section is configured to automatically exhibit the decreased AC resistance above or near a selected temperature.

289. The system of claim 268, further comprising a non-ferromagnetic material coupled to the ferromagnetic material, wherein the non-ferromagnetic material has a higher electrical conductivity than the ferromagnetic material.

290. The system of claim 268, further comprising a second ferromagnetic material coupled to the ferromagnetic material.

291. The system of claim 268, wherein the selected temperature is approximately the Curie temperature of the ferromagnetic material.

292. The system of claim 268, wherein at least one of the electrical conductors is electrically coupled to the earth, and wherein electrical current is propagated from the electrical conductor to the earth.

293. The system of claim 268, wherein the heater section is elongated, and wherein the reduced amount of heat is less than about 400 watts per meter of length of the heater section.

294. The system of claim 268, wherein the heater section is elongated, and wherein the heat output from the ferromagnetic material is greater than about 400 watts per meter of length of the heater section when the temperature of the ferromagnetic material is below the selected temperature during use.

295. The system of claim 268, wherein the ferromagnetic material has a turndown ratio of at least about 2 to 1.

296. The system of claim 268, further comprising a deformation resistant container configured to contain at least one electrical conductor, and wherein the selected temperature is chosen such that the deformation resistant container has a creep-rupture strength of at least about 3000 psi at 100,000 hours at the selected temperature.

297. The system of claim 268, wherein one or more electrical conductors comprise two or more electrical conductors and an electrically insulating material placed between at least two of the electrical conductors.

298. The system of claim 268, wherein the ferromagnetic material comprises iron, nickel, chromium, cobalt, tungsten, or a mixture thereof.

299. The system of claim 268, wherein the ferromagnetic material comprises a mixture of iron and nickel.

300. The system of claim 268, wherein the ferromagnetic material comprises a mixture of iron and cobalt.

301. The system of claim 268, wherein the system is configured such that the ferromagnetic material has a thickness of at least about 3/4 of a skin depth of the AC at the Curie temperature of the ferromagnetic material.

302. The system of claim 268, wherein the system is configured such that the ferromagnetic material has a thickness of at least about 3/4 of a skin depth of the AC at the Curie temperature of the ferromagnetic material, and wherein the ferromagnetic material is coupled to a material that is more conductive that the ferromagnetic material such that the coupled materials exhibit a greater conductivity at the Curie temperature of the ferromagnetic material than the ferromagnetic material with the same thickness as the coupled materials.

303. The system of claim 268, wherein the system is configured such that the ferromagnetic material has a thickness of at least about a skin depth of the AC at the Curie temperature of the ferromagnetic material.

304. The system of claim 268, wherein the ferromagnetic material comprises two or more ferromagnetic materials with different Curie temperatures.

305. The system of claim 268, wherein at least one of the electrical conductors comprises ferromagnetic material and non-ferromagnetic electrically conductive material.

306. The system of claim 268, wherein the subsurface formation comprises a hydrocarbon containing formation, and wherein at least a portion of the electrically resistive ferromagnetic material is located proximate a relatively rich zone of the formation.

307. The system of claim 268, wherein the ferromagnetic material is coupled to a corrosion resistant material.

308. The system of claim 268, wherein at least one of the electrical conductors is part of an insulated conductor heater.

309. The system of claim 268, wherein at least one of the electrical conductors is part of a conductor-in-conduit heater.

310. The system of claim 268, wherein the ferromagnetic material is coupled to a material that is more conductive than the ferromagnetic material, and wherein thicknesses of both materials and skin depth characteristics of the ferromagnetic material are configured to provide a selected resistance profile as a function of temperature.

311. The system of claim 268, wherein at least a portion of at least one of the electrical conductors comprises a relatively flat AC resistance profile in a temperature range between about 100 °C and 750 °C.

312. The system of claim 268, wherein at least a portion of at least one of the electrical conductors comprises a relatively flat AC resistance profile in a temperature range between about 100 °C and 700 °C and a relatively sharp resistance profile at a temperature above about 700 °C and less than about 850 °C.

313. The system of claim 268, wherein at least a portion of at least one of the electrical conductors comprises a relatively flat AC resistance profile in a temperature range between about 300 °C and 600 °C.

314. The system of claim 268, wherein at least a portion of at least one electrically resistive ferromagnetic material is longer than about 10 m.

315. The system of claim 268, wherein the system is configured to sharply reduce the heat output at or near the selected temperature.

316. The system of claim 268, wherein at least one of the electrical conductors comprises an electrically resistive ferromagnetic material drawn together with or against a material with a higher conductivity than the ferromagnetic material.

317. The system of claim 268, wherein at least one of the electrical conductors comprises an elongated conduit comprising a center portion and an outer portion, and wherein the center portion comprises iron and has a diameter of at least about 0.5 cm.

318. The system of claim 268, wherein at least one of the electrical conductors comprises a composite material, wherein the composite material comprises a first material with a resistance that decreases when the first material is heated to the selected temperature, wherein the composite material comprises a second material that is more electrically conductive than the first material, and wherein the first material is coupled to the second material.

319. The system of claim 268, wherein the reduced amount of heat comprises a heating rate lower than the rate at which the formation will absorb or transfer heat, thereby inhibiting overheating of the formation.

320. The system of claim 268, wherein at least one of the electrical conductors is elongated and configured such that only electrically resistive sections at or near the selected temperature will automatically reduce the heat output.

321. The system of claim 268, wherein the system is configured such that an AC resistance of at least one of the electrical conductors increases with an increase in temperature up to the selected temperature.

322. The system of claim 268, wherein the system is configured such that an AC resistance of at least one of the electrical conductors decreases with an increase in temperature above the selected temperature.

323. The system of claim 268, wherein the system is configured to apply AC of at least about 70 amps to at least one of the electrical conductors.

324. The system of claim 268, wherein the system is configured to apply AC at about 180 Hz.

325. The system of claim 268, wherein the system is configured to apply AC at about 60 Hz.

326. The system of claim 268, wherein the ferromagnetic material is positioned in an opening in the formation, and wherein at least a portion of the opening in the formation adjacent to the ferromagnetic material comprises an uncased wellbore.

327. The system of claim 268, wherein the ferromagnetic material is configured to radiatively heat the formation.

328. The system of claim 268, wherein at least one of the electrical conductors is located in an overburden of the formation.

329. The system of claim 268, wherein at least one of the electrical conductors is coupled to a cable, and wherein the cable comprises a plurality of copper wires coated with an oxidation resistant alloy.

330. A method for heating a subsurface formation, comprising:

applying AC to one or more electrical conductors located in the subsurface formation to provide an electrically resistive heat output, wherein at least one of the electrical conductors comprises an electrically resistive ferromagnetic material that provides heat when AC flows through the electrically resistive ferromagnetic material, and wherein such electrical conductor

comprising electrically resistive ferromagnetic material provides a reduced amount of heat above or near a selected temperature; and

allowing the heat to transfer from the electrically resistive ferromagnetic material to a part of the subsurface formation.

331. The method of claim 330, wherein the electrically resistive ferromagnetic material automatically provides a selected reduced amount of heat above or near a selected temperature.

332. The method of claim 330, further comprising placing one or more of the electrical conductors in a wellbore in the formation.

333. The method of claim 330, wherein an AC resistance of the ferromagnetic material decreases above the selected temperature to provide the reduced amount of heat.

334. The method of claim 330, wherein a thickness of the ferromagnetic material is greater than about ¾ of a skin depth of the AC at the Curie temperature of the ferromagnetic material.

335. The method of claim 330, wherein the selected temperature is approximately the Curie temperature of the ferromagnetic material.

336. The method of claim 330, wherein the selected temperature is within about 50 °C of the Curie temperature of the ferromagnetic material.

337. The method of claim 330, wherein the subsurface formation comprises a hydrocarbon containing formation.

338. The method of claim 330, wherein the subsurface formation comprises a hydrocarbon containing formation, and further comprising heating at least some hydrocarbons in the formation such that at least some of the hydrocarbons are pyrolyzed.

339. The method of claim 330, wherein one or more of the electrical conductors are located in a wellbore, and further comprising providing a reduced amount of heat of less than about 400 watts per meter of length of the wellbore while one or more of the electrical conductors are above or near the selected temperature.

340. The method of claim 330, wherein one or more of the electrical conductors are located in a wellbore, and further comprising providing a heat output of greater than about 400 watts per meter of length of the wellbore while one or more of the electrical conductors are below the selected temperature.

341. The method of claim 330, further comprising controlling the amount of current applied to one or more of the electrical conductors to control the amount of heat provided by the ferromagnetic material.

342. The method of claim 330, further comprising applying an AC of at least about 70 amps to the electrical conductors.

343. The method of claim 330, further comprising applying an AC of at least about 100 amps to the electrical conductors.

344. The method of claim 330, further comprising applying the AC at a frequency of about 180 Hz.

345. The method of claim 330, wherein the heat transfers radiatively from at least one of the electrical conductors to at least the part of the formation.

346. The method of claim 330, further comprising providing a relatively constant heat output when an electrical conductor is in a temperature range between about 300 °C and 600 °C.

347. The method of claim 330, further comprising providing a relatively constant heat output when an electrical conductor is in a temperature range between about 100 °C and 750 °C.

348. The method of claim 330, further comprising providing a heat output from at least one of the electrical conductors, wherein an AC resistance of one or more of such electrical conductors above or near the selected temperature is about 80% or less of the AC resistance of such one or more electrical conductors at about 50 °C below the selected temperature.

349. The method of claim 330, further comprising providing an initial electrically resistive heat output when the electrical conductor providing the heat output is at least about 50 °C below the selected temperature, and automatically providing the reduced amount of heat above or near the selected temperature.

350. The method of claim 330, wherein the subsurface formation comprises contaminated soil, and further comprising using the provided heat to decontaminate the soil.

351. The method of claim 330, wherein at least one of the electrical conductors is electrically coupled to the earth, and further comprising propagating electrical current from at least one of the electrical conductors to the earth.

352. The method of claim 330, wherein the subsurface formation comprises a hydrocarbon containing formation, and further comprising producing a mixture from the formation, wherein the produced mixture comprises condensable hydrocarbons having an API gravity of at least about 25°.

353. The method of claim 330, wherein the subsurface formation comprises a hydrocarbon containing formation, and further comprising controlling a pressure in at least a part of the formation, wherein the controlled pressure is at least about 2.0 bars absolute.

354. The method of claim 330, wherein the subsurface formation comprises a hydrocarbon containing formation, and further comprising controlling formation conditions such that a produced mixture comprises a partial pressure of H_2 greater than about 0.5 bars.

355. The method of claim 330, wherein the subsurface formation comprises a hydrocarbon containing formation, and further comprising altering a pressure in the formation to inhibit production of hydrocarbons having carbon numbers greater than about 25.

356. The method of claim 330, wherein the subsurface formation comprises a hydrocarbon containing formation, and further comprising controlling the provided heat to inhibit production of hydrocarbons from the formation having carbon numbers greater than about 25.

357. The method of claim 330, wherein the subsurface formation comprises a hydrocarbon containing formation, and further comprising heating at least a portion of the part of the formation to a minimum pyrolysis temperature of about 270 °C.

358. The method of claim 330, further comprising controlling a skin depth in the ferromagnetic material by controlling a frequency of the applied AC.

359. The method of claim 330, further comprising increasing the AC applied to at least one of the electrical conductors as the temperature of such electrical conductors increases, and continuing to do so until the temperature is at or near the selected temperature.

360. The method of claim 330, further comprising controlling an amount of current applied to at least one of the electrical conductors to control an amount of heat output from such electrical conductors.

361. The method of claim 330, further comprising increasing an amount of current applied to at least one of the electrical conductors to decrease an amount of heat output from such electrical conductors.

362. The method of claim 330, further comprising decreasing an amount of current applied to at least one of the electrical conductors to increase an amount of heat output from such electrical conductors.

363. The method of claim 330, further comprising producing fluids from the formation, and producing refined products from the produced fluids.

364. The method of claim 330, further comprising producing fluids from the formation, and producing a blending agent from the produced fluids.

365. The method of claim 330, further comprising providing heat from at least one of the electrical conductors to fluids in a wellbore in the formation.

366. The method of claim 330, further comprising producing fluids from the formation, and blending the produced fluids with hydrocarbons having an API gravity below about 15°.

367. A method for heating a subsurface formation, comprising:

applying AC to one or more electrical conductors placed in an opening in the formation, wherein at least one of the electrical conductors comprises one or more electrically resistive sections;

providing an electrically resistive heat output from at least one of the electrically resistive sections, wherein such electrically resistive sections provide a reduced amount of heat above or near a selected temperature that is about 20% or less of the heat output at about 50 °C below the selected temperature; and

allowing the heat to transfer from at least one of the electrically resistive sections to at least a part of the formation.

368. The method of claim 367, further comprising applying the AC at a frequency of about 180 Hz.

369. The method of claim 367, further comprising placing one or more of the electrical conductors in the opening.

370. The method of claim 367, further comprising providing an initial electrically resistive heat output when the electrically resistive section providing the heat output is at least about 50

°C below the selected temperature, and automatically providing the reduced amount of heat above or near the selected temperature.

371. The method of claim 367, further comprising providing a reduced amount of heat above or near the selected temperature that is less than about 20% of the heat output at about 40 °C below the selected temperature.

372. The method of claim 367, further comprising providing a reduced amount of heat above or near the selected temperature that is less than about 20% of the heat output at about 30 °C below the selected temperature.

373. The method of claim 367, further comprising providing a reduced amount of heat above or near the selected temperature that is less than about 15% of the heat output at about 50 °C below the selected temperature.

374. The method of claim 367, further comprising providing a reduced amount of heat above or near the selected temperature that is less than about 10% of the heat output at about 50 °C below the selected temperature.

375. The method of claim 367, further comprising allowing the heat to transfer radiatively from at least one of the electrically resistive sections to at least a part of the formation.

376. The method of claim 367, wherein at least one of the electrically resistive sections comprises ferromagnetic material, and wherein the selected temperature is approximately the Curie temperature of the ferromagnetic material.

377. The method of claim 367, wherein at least one of the electrically resistive sections comprises ferromagnetic material, and wherein the selected temperature is within about 50 °C of the Curie temperature of the ferromagnetic material.

378. The method of claim 367, further comprising providing a relatively constant heat output from one or more of the electrically resistive sections when such electrically resistive sections are in a temperature range between about 100 °C and about 750 °C.

379. The method of claim 367, further comprising automatically decreasing an AC resistance of at least one of the electrically resistive sections when such an electrically resistive section is above the selected temperature to provide the reduced amount of heat above the selected temperature.

380. The method of claim 367, wherein the subsurface formation comprises a hydrocarbon containing formation.

381. The method of claim 367, wherein the subsurface formation comprises a hydrocarbon containing formation, and further comprising heating at least some hydrocarbons in the formation to pyrolyze at some of the hydrocarbons in the formation.

382. The method of claim 367, wherein the subsurface formation comprises a hydrocarbon containing formation, and further comprising positioning at least one of the electrically resistive sections proximate a relatively rich zone of the formation.

383. The method of claim 367, further comprising providing a reduced amount of heat of less than about 400 watts per meter of length of the opening above or near the selected temperature.

384. The method of claim 367, further comprising applying AC of at least about 70 amps to at least one of the electrical conductors.

385. A method for heating a subsurface formation, comprising:

applying a current to one or more electrical conductors placed in an opening in the formation, wherein at least one of the electrical conductors comprises one or more electrically resistive sections;

providing an electrically resistive heat output from at least one of the electrically resistive sections, wherein such electrically resistive sections provide a reduced amount of heat above or near a selected temperature that is about 20% or less of the heat output at about 50 °C below the selected temperature; and

allowing the heat to transfer from at least one of the electrically resistive sections to at least a part of the formation.

386. The method of claim 385, further comprising applying alternating current to the one or more electrical conductors.

387. The method of claim 385, further comprising applying direct current to the one or more electrical conductors.

388. The method of claim 385, further comprising placing one or more of the electrical conductors in the opening.

389. The method of claim 385, further comprising providing an initial electrically resistive heat output when the electrically resistive section providing the heat output is at least about 50 °C below the selected temperature, and automatically providing the reduced amount of heat above or near the selected temperature.

390. The method of claim 385, further comprising providing a reduced amount of heat above or near the selected temperature that is less than about 20% of the heat output at about 40 °C below the selected temperature.

391. The method of claim 385, further comprising providing a reduced amount of heat above or near the selected temperature that is less than about 20% of the heat output at about 30 °C below the selected temperature.

392. The method of claim 385, further comprising allowing the heat to transfer radiatively from at least one of the electrically resistive sections to at least a part of the formation.

393. The method of claim 385, further comprising automatically decreasing an AC resistance of at least one of the electrically resistive sections when such an electrically resistive section is above the selected temperature to provide the reduced amount of heat above the selected temperature.

394. The method of claim 385, further comprising automatically increasing a resistance of at least one of the electrically resistive sections when such an electrically resistive section is above the selected temperature to provide the reduced amount of heat above the selected temperature.

395. The method of claim 385, further comprising automatically increasing a resistance of at least one of the electrically resistive sections by a factor of at least about 4 when such an electrically resistive section is above the selected temperature to provide the reduced amount of heat above the selected temperature.

396. The method of claim 385, further comprising automatically increasing a resistance of at least one of the electrically resistive sections when such an electrically resistive section is above the selected temperature to provide the reduced amount of heat above the selected temperature such that electrical current propagates through at least one other electrically resistive section.

397. The method of claim 385, wherein the subsurface formation comprises a hydrocarbon containing formation, and further comprising heating at least some hydrocarbons in the formation to pyrolyze at some of the hydrocarbons in the formation.

398. A method for heating a subsurface formation, comprising:

applying AC to one or more electrical conductors placed in an opening in the formation, wherein at least one of the electrical conductors comprises an electrically resistive ferromagnetic material that provides an electrically resistive heat output when AC is applied to the ferromagnetic material, and wherein AC is applied when the ferromagnetic material is about 50 °C below a Curie temperature of the ferromagnetic material to provide an initial electrically resistive heat output;

allowing the temperature of the ferromagnetic material to approach or rise above the Curie temperature of the ferromagnetic material; and

allowing the heat output from at least one of the electrical conductors to decrease below the initial electrically resistive heat output as a result of a change in AC resistance of such electrical conductor caused by the temperature of the ferromagnetic material approaching or rising above the Curie temperature of the ferromagnetic material.

399. The method of claim 398, further comprising applying AC at a frequency of about 180 Hz.

400. The method of claim 398, further comprising placing one or more of the electrical conductors in the opening.

401. The method of claim 398, wherein the decreased heat output is less than about 50% of the initial heat output.

402. The method of claim 398, wherein the decreased heat output is less than about 20% of the initial heat output.

403. The method of claim 398, further comprising allowing the heat to transfer radiatively from at least one of the electrical conductors to at least a part of the formation.

404. The method of claim 398, wherein the subsurface formation comprises a hydrocarbon containing formation.

405. The method of claim 398, wherein the subsurface formation comprises a hydrocarbon containing formation, and further comprising heating at least some hydrocarbons in the formation to pyrolyze at some of the hydrocarbons in the formation.

406. The method of claim 398, further comprising producing at least some fluids from the formation.

407. The method of claim 398, wherein the declined heat output is less than about 400 watts per meter of length of the opening.

408. The method of claim 398, further comprising applying AC of at least about 70 amps to at least one of the electrical conductors.

409. A heater system, comprising:

an AC supply configured to provide AC at a voltage above about 200 volts;

an electrical conductor comprising one or more ferromagnetic sections, wherein the electrical conductor is electrically coupled to the AC supply, wherein at least one of the ferromagnetic sections is configured to provide an electrically resistive heat output during application of AC to the electrical conductor such that heat can transfer to material adjacent to such ferromagnetic section, and wherein such ferromagnetic section is configured to provide a reduced amount of heat above or near a selected temperature during use; and

wherein the selected temperature is at or about the Curie temperature of the ferromagnetic section.

410. The heater system of claim 409, wherein the AC supply is configured to provide the AC at a voltage above about 650 volts.

411. The heater system of claim 409, wherein the AC supply is configured to provide the AC at a voltage above about 1000 volts.

412. The heater system of claim 409, wherein the heater system is configured to provide heat to a subsurface formation.

413. The heater system of claim 409, wherein the heater system is configured to provide heat to a hydrocarbon containing formation.

414. The heater system of claim 409, wherein the heater system is configured to provide heat to a hydrocarbon containing formation, and wherein the heater system is configured to pyrolyze at least some hydrocarbons in the formation.

415. The heater system of claim 409, wherein the heater system is configured to provide heat to contaminated soil, and wherein the heater system is configured to decontaminate at least a portion of the contaminated soil.

416. The heater system of claim 409, wherein the heater system is configured to provide heat to at least a portion of an opening in a subsurface formation.

417. The heater system of claim 409, wherein the heater system comprises three or more electrical conductors, and wherein at least three of the electrical conductors are configured to be coupled in a three-phase electrical configuration.

418. The heater system of claim 409, wherein at least one of the ferromagnetic sections comprises iron, nickel, chromium, cobalt, tungsten, or a mixture thereof.

419. The heater system of claim 409, wherein at least one of the ferromagnetic sections has a thickness of at least about ¾ of a skin depth of the AC at the Curie temperature of such ferromagnetic sections.

420. The heater system of claim 409, wherein the heat output below the selected temperature is greater than about 400 watts per meter of the electrical conductor.

421. The heater system of claim 409, wherein at least one portion of the electrical conductor is configured to comprise a relatively flat AC resistance profile in a temperature range between about 100 °C and 750 °C.

422. The heater system of claim 409, wherein at least a portion of the electrical conductor is longer than about 10 m.

423. The heater system of claim 409, wherein the heater system is configured to sharply reduce the heat output at or near the selected temperature.

424. The heater system of claim 409, wherein the heater system is configured such that the heat output from at least a portion of the system decreases at or near the selected temperature due to the Curie effect.

425. The heater system of claim 409, wherein the heater system is configured such that an AC resistance of the electrical conductor increases with an increase in temperature up to the selected temperature, and wherein the system is configured such that an AC resistance of the electrical conductor decreases with an increase in temperature from above the selected temperature.

426. The heater system of claim 409, wherein the system is configured to apply AC of at least about 70 amps to the electrical conductor.

427. The heater system of claim 409, wherein at least one of the electrical conductors comprises a turndown ratio of at least about 2 to 1.

428. The heater system of claim 409, wherein the system is configured to apply AC at about 180 Hz.

429. The heater system of claim 409, wherein the heater system is configured to withstand operating temperatures of about 250 °C or above.

430. The heater system of claim 409, wherein the heater system withstands operating temperatures of about 250 °C or above.

431. The heater system of claim 409, wherein the electrical conductor is configured to automatically provide the reduced amount of heat above or near the selected temperature.

432. A method of heating, comprising:

providing an AC at a voltage above about 200 volts to one or more electrical conductors to provide an electrically resistive heat output, wherein at least one of the electrical conductors comprises one or more electrically resistive sections; and

wherein at least one of the electrically resistive sections comprises an electrically resistive ferromagnetic material and provides a reduced amount of heat above or near a selected temperature, and wherein the selected temperature is within about 50 °C of the Curie temperature of the ferromagnetic material.

433. The method of claim 432, further comprising providing the AC at a voltage above about 650 volts.

434. The method of claim 432, further comprising providing the AC to at least one of the electrical conductors at or above the selected temperature.

435. The method of claim 432, further comprising providing the AC at a frequency of about 180 Hz.

436. The method of claim 432, further comprising placing one or more of the electrical conductors in a wellbore in a subsurface formation.

437. The method of claim 432, further comprising providing an initial electrically resistive heat output when the electrical conductor providing the heat output is at least about 50 °C below the selected temperature, and automatically providing the reduced amount of heat above or near the selected temperature.

438. The method of claim 432, further comprising allowing heat to transfer from at least one of the electrically resistive sections to at least a part of a subsurface formation.

439. The method of claim 432, further comprising providing a relatively constant heat output when the ferromagnetic material is in a temperature range between about 300 °C and about 600 °C.

440. The method of claim 432, further comprising providing a relatively constant heat output when the ferromagnetic material is in a temperature range between about 100 °C and about 750 °C.

441. The method of claim 432, wherein an AC resistance of at least one of the electrically resistive sections decreases above the selected temperature to provide the reduced amount of heat.

442. The method of claim 432, wherein the electrically resistive ferromagnetic material has a thickness of at least about ¾ of a skin depth of AC at the Curie temperature of the ferromagnetic material.

443. The method of claim 432, further comprising allowing heat to transfer from at least one of the electrically resistive sections to at least a part of a subsurface formation, wherein the subsurface formation comprises a hydrocarbon containing formation.

444. The method of claim 432, further comprising allowing heat to transfer from at least one of the electrically resistive sections to at least a part of a hydrocarbon containing formation, and further comprising at least some hydrocarbons in the formation.

445. The method of claim 432, wherein the reduced amount of heat is less than about 400 watts per meter of length of an electrical conductor.

446. The method of claim 432, further comprising controlling a skin depth in at least one of the electrically resistive sections by controlling a frequency of the applied AC.

447. The method of claim 432, further comprising applying additional current to at least one of the electrically resistive sections as the temperature of such electrically resistive sections increases until the temperature is at or near the selected temperature.

448. The method of claim 432, wherein an amount of heat output provided from at least one of the electrically resistive sections is determined by an amount of current applied to at least one of the electrical conductors.

449. The method of claim 432, further comprising controlling an amount of heat provided by at least one of the electrically resistive sections by controlling an amount of current applied to at least one of the electrical conductors.

450. The method of claim 432, further comprising applying current of at least about 70 amps to at least one of the electrical conductors.

451. The method of claim 432, further comprising applying current of at least about 100 amps to at least one of the electrical conductors.

452. A heater system, comprising:

an AC supply configured to provide AC at a voltage above about 200 volts;

an electrical conductor coupled to the AC supply, and wherein the electrical conductor comprises one or more electrically resistive sections, wherein at least one of the electrically resistive sections comprises an electrically resistive ferromagnetic material, wherein the electrical conductor is configured to provide an electrically resistive heat output during application of the AC to the electrical conductor, and wherein the electrical conductor is configured to provide a reduced amount of heat above or near a selected temperature that is about 20% or less of the heat output at about 50 °C below the selected temperature during use; and

wherein the selected temperature is at or about the Curie temperature of the ferromagnetic material.

453. The heater system of claim 452, wherein the AC supply is configured to provide AC at a voltage above about 650 volts.

454. The heater system of claim 452, wherein the AC supply is configured to provide AC at a voltage above about 1000 volts.

455. The heater system of claim 452, wherein the heater system is configured to provide heat to a subsurface formation.

456. The heater system of claim 452, wherein the heater system is configured to provide heat to a hydrocarbon containing formation.

457. The heater system of claim 452, wherein the heater system is configured to provide heat to a hydrocarbon containing formation, and wherein the system is configured to pyrolyze at least some hydrocarbons in the formation.

458. The heater system of claim 452, wherein the ferromagnetic material comprises iron, nickel, chromium, cobalt, tungsten, or a mixture thereof.

459. The heater system of claim 452, wherein the heat output below the selected temperature is greater than about 400 watts per meter of length of the electrical conductor.

460. The heater system of claim 452, wherein at least one portion of the electrical conductor is configured to comprise a relatively flat AC resistance profile in a temperature range between about 100 °C and 750 °C.

461. The heater system of claim 452, wherein the heater system is configured to sharply reduce the heat output at or near the selected temperature.

462. The heater system of claim 452, wherein the system is configured to apply AC of at least about 70 amps to the electrical conductor.

463. The heater system of claim 452, wherein at least one of the electrical conductors comprises a turndown ratio of at least about 2 to 1.

464. The heater system of claim 452, wherein the system is configured to apply AC at about 180 Hz.

465. The heater system of claim 452, wherein the electrical conductor is configured to automatically provide the reduced amount of heat above or near the selected temperature.

466. A heater system, comprising:

an AC supply configured to provide AC at a frequency between about 100 Hz and about 1000 Hz;

an electrical conductor electrically coupled to the AC supply, wherein the electrical conductor comprises at least one electrically resistive section configured to provide an electrically resistive heat output during application of the AC to the electrically resistive section during use; and

wherein the electrical conductor comprises an electrically resistive ferromagnetic material and is configured to provide a reduced amount of heat above or near a selected temperature, and wherein the selected temperature is within about 50 °C of the Curie temperature of the ferromagnetic material.

467. The heater system of claim 466, wherein the AC supply is coupled to a supply of line current, and wherein the AC supply is configured to provide AC at about three times the frequency of the line current.

468. The heater system of claim 466, wherein the AC supply is configured to provide AC with a frequency between about 140 Hz and about 200 Hz.

469. The heater system of claim 466, wherein AC supply is configured to provide AC with a frequency between about 400 Hz and about 550 Hz.

470. The heater system of claim 466, wherein the heater system is configured to provide heat to a subsurface formation.

471. The heater system of claim 466, wherein the heater system is configured to provide heat to a hydrocarbon containing formation, and wherein the heater system is configured to pyrolyze at least some hydrocarbons in the formation.

472. The heater system of claim 466, wherein the heater system is configured to provide heat to contaminated soil, and wherein the heater system is configured to decontaminate at least a portion of the contaminated soil.

473. The heater system of claim 466, wherein the heater system is configured to provide heat to at least a portion of an opening in a subsurface formation.

474. The heater system of claim 466, wherein the ferromagnetic material comprises iron, nickel, chromium, cobalt, tungsten, or a mixture thereof.

475. The heater system of claim 466, wherein a thickness of the ferromagnetic material is at least about ¾ of a skin depth of the AC at the Curie temperature of the ferromagnetic material.

476. The heater system of claim 466, wherein the heat output below the selected temperature is greater than about 400 watts per meter of the electrical conductor.

477. The heater system of claim 466, wherein at least a portion of at least one of the electrical conductors is configured to comprise a relatively flat AC resistance profile in a temperature range between about 100 °C and 750 °C.

478. The heater system of claim 466, wherein at least a portion of at least one of the electrical conductors is longer than about 10 m.

479. The heater system of claim 466, wherein the heater system is configured to sharply reduce the heat output at or near the selected temperature.

480. The heater system of claim 466, wherein the heater system is configured such that the heat output of at least a portion of the system decreases at or near the selected temperature due to the Curie effect.

481. The heater system of claim 466, wherein the system is configured to apply AC of at least about 70 amps to at least one of the electrically resistive sections.

482. The heater system of claim 466, wherein at least one of the electrically resistive sections comprises a turndown ratio of at least about 2 to 1.

483. The heater system of claim 466, wherein the heater system is configured to withstand operating temperatures of about 250 °C or above.

484. The heater system of claim 466, wherein the electrical conductor is configured to automatically provide the reduced amount of heat above or near the selected temperature.

485. A method of heating, comprising:

providing AC at a frequency between about 100 Hz and about 1000 Hz to an electrical conductor to provide an electrically resistive heat output, wherein the electrical conductor comprises at least one electrically resistive section; and

wherein at least one of the electrically resistive sections comprises an electrically resistive ferromagnetic material and provides a reduced amount of heat above or near a selected temperature, and wherein the selected temperature is within about 50 °C of the Curie temperature of the ferromagnetic material.

486. The method of claim 485, further comprising providing the AC to the electrical conductor when the electrical conductor is at or above the selected temperature.

487. The method of claim 485, further comprising placing the electrical conductor in a wellbore in a subsurface formation.

488. The method of claim 485, further comprising providing an initial electrically resistive heat output when the electrical conductor providing the heat output is at least about 50 °C below the selected temperature, and automatically providing the reduced amount of heat above or near the selected temperature.

489. The method of claim 485, further comprising providing the AC at about three times the frequency of line current from an AC supply.

490. The method of claim 485, further comprising providing the AC at a frequency between about 140 Hz and about 200 Hz.

491. The method of claim 485, further comprising providing the AC at a frequency between about 400 Hz and about 550 Hz.

492. The method of claim 485, further comprising providing the AC to the electrical conductor when the electrical conductor is at or above the selected temperature.

493. The method of claim 485, further comprising allowing heat to transfer from at least one of the electrically resistive sections to at least a part of a subsurface formation.

494. The method of claim 485, further comprising providing a relatively constant heat output when the ferromagnetic material is in a temperature range between about 100 °C and 750 °C.

495. The method of claim 485, wherein an AC resistance of the electrical conductor decreases above the selected temperature to provide the reduced amount of heat.

496. The method of claim 485, wherein a thickness of the ferromagnetic material is at least about ¾ of a skin depth of the AC at the Curie temperature of the ferromagnetic material.

497. The method of claim 485, further comprising allowing heat to transfer from the electrical conductor to at least a part of a subsurface formation, wherein the subsurface formation comprises a hydrocarbon containing formation.

498. The method of claim 485, further comprising allowing heat to transfer from the electrical conductor to at least a part of a hydrocarbon containing formation, and pyrolyzing at least some hydrocarbons in the formation.

499. The method of claim 485, further comprising providing a reduced amount of heat above or near the selected temperature of less than about 400 watts per meter of length of the electrical conductor.

500. The method of claim 485, further comprising controlling a skin depth in the electrical conductor by controlling a frequency of the AC applied to the electrical conductor.

501. The method of claim 485, further comprising controlling the heat applied from the electrical conductor by allowing less heat to be applied from any part of the electrical conductor that is at or near the selected temperature.

502. The method of claim 485, further comprising controlling the amount of current applied to the electrical conductor to control an amount of heat provided by at least one of the electrically resistive sections.

503. The method of claim 485, further comprising applying current of at least about 70 amps to the electrical conductor.

504. A heater system, comprising:

an AC supply configured to provide AC at a frequency between about 100 Hz and about 1000 Hz;

an electrical conductor electrically coupled to the AC supply, wherein the electrical conductor comprises at least one electrically resistive section configured to provide an electrically resistive heat output during application of the AC from the AC supply to the electrically resistive section during use; and

wherein the electrical conductor comprises an electrically resistive ferromagnetic material and is configured to provide a reduced amount of heat above or near a selected temperature that is about 20% or less of the heat output at about 50 °C below the selected temperature, and wherein the selected temperature is at or about the Curie temperature of the ferromagnetic material.

505. The heater system of claim 504, wherein the AC supply is coupled to a supply of line current, and wherein the AC supply is configured to provide AC at about three times the frequency of the line current.

506. The heater system of claim 504, wherein the frequency is between about 140 Hz and about 200 Hz.

507. The heater system of claim 504, wherein the frequency is between about 400 Hz and about 550 Hz.

508. The heater system of claim 504, wherein the heater system is configured to provide heat to a subsurface formation.

509. The heater system of claim 504, wherein the heater system is configured to provide heat to a hydrocarbon containing formation, and wherein the heater system is configured to pyrolyze at least some hydrocarbons in the formation.

510. The heater system of claim 504, wherein the heater system is configured to provide heat to at least a portion of an opening in a subsurface formation.

511. The heater system of claim 504, wherein the ferromagnetic material comprises iron, nickel, chromium, cobalt, tungsten, or a mixture thereof.

512. The heater system of claim 504, wherein a thickness of the ferromagnetic material is at least about ¾ of a skin depth of the AC at the Curie temperature of the ferromagnetic material.

513. The heater system of claim 504, wherein the heat output below the selected temperature is greater than about 400 watts per meter of length of the electrical conductor.

514. The heater system of claim 504, wherein at least a portion of at least one of the electrical conductors is configured to comprise a relatively flat AC resistance profile in a temperature range between about 100 °C and 750 °C.

515. The heater system of claim 504, wherein the heater system is configured to sharply reduce the heat output at or near the selected temperature.

516. The heater system of claim 504, wherein the system is configured to apply AC of at least about 70 amps to at least one of the electrically resistive sections.

517. The heater system of claim 504, wherein at least one of the electrically resistive sections comprises a turndown ratio of at least about 2 to 1.

518. The heater system of claim 504, wherein the electrical conductor is configured to automatically provide the reduced amount of heat above or near the selected temperature.

519. A heater, comprising:

an electrical conductor configured to generate an electrically resistive heat output during application of AC to the electrical conductor, wherein the electrical conductor comprises an electrically resistive ferromagnetic material at least partially surrounding a non-ferromagnetic material such that the heater provides a reduced amount of heat above or near a selected temperature;

an electrical insulator at least partially surrounding the electrical conductor; and
a sheath at least partially surrounding the electrical insulator.

520. The heater of claim 519, wherein the electrical conductor comprises coextruded ferromagnetic material and non-ferromagnetic material.

521. The heater of claim 519, wherein the electrical insulator comprises a pre-formed electrical insulator.

522. The heater of claim 519, wherein the sheath comprises electrically conductive material.

523. The heater of claim 519, wherein the sheath comprises two or more electrically conductive strips that are longitudinally welded together.

524. The heater of claim 519, wherein the heater comprises one or more portions coupled together, wherein each portion comprises at least a section of the electrical conductor.

525. The heater of claim 519, wherein the heater comprises one or more portions coupled together, wherein each portion comprises at least one section of the electrical conductor, and wherein at least one section of the electrical conductor has been coupled to at least another section of the electrical conductor using a weld.

526. The heater of claim 525, wherein the weld comprises non-ferromagnetic welding material.

527. The heater of claim 519, wherein the heater is configured to allow heat to transfer from the heater to a part of a subsurface formation to pyrolyze at least some hydrocarbons in the subsurface formation.

528. The heater of claim 519, wherein the heater is configured to be placed in an opening in a subsurface formation.

529. The heater of claim 519, wherein heater is configured such that a resistance of the ferromagnetic material decreases above the selected temperature such that the heater provides the reduced amount of heat above the selected temperature.

530. The heater of claim 519, further comprising a second ferromagnetic material coupled to the ferromagnetic material.

531. The heater of claim 519, wherein the heater is configured such that the selected temperature is approximately the Curie temperature of the ferromagnetic material.

532. The heater of claim 519, wherein the ferromagnetic material comprises iron.

533. The heater of claim 519, wherein the reduced amount of heat is less than about 400 watts per meter of length of the heater.

534. The heater of claim 519, wherein the heat output is greater than about 400 watts per meter of length of the heater at about 50 °C below the selected temperature.

535. The heater of claim 519, wherein the heater comprises a relatively flat AC resistance profile in a temperature range between about 100 °C and 750 °C.

536. The heater of claim 519, wherein the heater is an elongated rod, and wherein at least a portion of the elongated rod is longer than about 10 m.

537. The heater of claim 519, wherein the ferromagnetic material comprises a turndown ratio of at least about 2 to 1.

538. The heater of claim 519, wherein the non-ferromagnetic material comprises copper.

539. The heater of claim 519, wherein the electrical conductor, the electrical insulator, and the sheath are portions of an insulated conductor heater.

540. The heater of claim 519, wherein the electrical insulator comprises magnesium oxide.

541. The heater of claim 519, wherein the sheath comprises steel.

542. The heater of claim 519, wherein the sheath comprises copper and steel.

543. The heater of claim 519, wherein the ferromagnetic material is configured to automatically provide the reduced amount of heat above or near the selected temperature that is about 20% or less of the heat output at about 50 °C below the selected temperature.

544. A method of heating a subsurface formation, comprising:

providing AC to an electrical conductor to provide an electrically resistive heat output, wherein the electrical conductor comprises an electrically resistive ferromagnetic material at least partially surrounding a non-ferromagnetic material such that the electrical conductor provides a reduced amount of heat above or near a selected temperature, wherein an electrical insulator at least partially surrounds the electrical conductor, and wherein a sheath at least partially surrounds the electrical insulator; and

allowing heat to transfer from the electrical conductor to at least part of the subsurface formation.

545. The method of claim 544, further comprising providing the AC to the electrical conductor when the electrical conductor is at or above the selected temperature.

546. The method of claim 544, further comprising placing the electrical conductor in a wellbore in the subsurface formation.

547. The method of claim 544, further comprising providing an initial electrically resistive heat output when the electrical conductor providing the heat output is at least about 50 °C below

the selected temperature, and automatically providing the reduced amount of heat above or near the selected temperature.

548. The method of claim 544, further comprising providing the AC at a frequency between about 100 Hz and about 1000 Hz.

549. The method of claim 544, further comprising providing a relatively constant heat output when the ferromagnetic material is in a temperature range between about 100 °C and 750 °C.

550. The method of claim 544, wherein an AC resistance of the electrical conductor decreases above the selected temperature to provide the reduced amount of heat.

551. The method of claim 544, wherein a thickness of the ferromagnetic material is at least about ¾ of a skin depth of the AC at the Curie temperature of the ferromagnetic material.

552. The method of claim 544, wherein the subsurface formation comprises a hydrocarbon containing formation.

553. The method of claim 544, further comprising allowing heat to transfer from the electrical conductor to at least a part of a hydrocarbon containing formation, and pyrolyzing at least some hydrocarbons in the formation.

554. The method of claim 544, further comprising providing a reduced amount of heat above or near the selected temperature of less than about 400 watts per meter of length of the electrical conductor.

555. The method of claim 544, further comprising controlling a skin depth in the electrical conductor by controlling a frequency of the AC applied to the electrical conductor.

556. The method of claim 544, further comprising controlling the heat applied from the electrical conductor by allowing less heat to be applied from any part of the electrical conductor that is at or near the selected temperature.

557. The method of claim 544, further comprising controlling the amount of current applied to the electrical conductor to control an amount of heat provided by at least one of the electrically resistive sections.

558. The method of claim 544, further comprising applying current of at least about 70 amps to the electrical conductor.

559. A heater, comprising:

an electrical conductor configured to generate an electrically resistive heat output during application of AC to the electrical conductor, wherein the electrical conductor comprises an electrically resistive ferromagnetic alloy at least partially surrounding a non-ferromagnetic material such that the heater provides a reduced amount of heat above or near a selected temperature, and wherein the ferromagnetic alloy comprises nickel;

an electrical insulator at least partially surrounding the electrical conductor; and

a sheath at least partially surrounding the electrical insulator.

560. The heater of claim 559, wherein the electrical insulator comprises a pre-formed electrical insulator.

561. The heater of claim 559, wherein the sheath comprises electrically conductive material.

562. The heater of claim 559, wherein the sheath is formed of electrically conductive strips that are longitudinally welded together.

563. The heater of claim 559, wherein the heater comprises one or more portions coupled together, wherein each portion comprises at least a section of the electrical conductor.

564. The heater of claim 559, wherein the heater comprises one or more portions coupled together, wherein each portion comprises at least one section of the electrical conductor, and wherein at least one section of the electrical conductor has been coupled to at least another section of the electrical conductor using a weld.

565. The heater of claim 564, wherein the weld comprises non-ferromagnetic welding material.

566. The heater of claim 559, wherein the ferromagnetic alloy comprises at least about 25 % by weight nickel.

567. The heater of claim 559, wherein the ferromagnetic alloy comprises less than about 45 % by weight nickel.

568. The heater of claim 559, wherein the ferromagnetic alloy comprises iron.

569. The heater of claim 559, wherein the ferromagnetic alloy comprises chromium.

570. The heater of claim 559, wherein the electrical insulator comprises silicone.

571. The heater of claim 559, wherein the heater is configured to allow heat to transfer from the heater to a part of a subsurface formation to mobilize at least some hydrocarbons in the subsurface formation.

572. The heater of claim 559, wherein the heater is configured to be placed in an opening in a subsurface formation.

573. The heater of claim 559, wherein a resistance of the ferromagnetic alloy decreases above the selected temperature such that the heater provides the reduced amount of heat above the selected temperature.

574. The heater of claim 559, wherein the selected temperature is approximately the Curie temperature of the ferromagnetic alloy.

575. The heater of claim 559, wherein the reduced amount of heat is less than about 200 watts per meter of length of the heater.

576. The heater of claim 559, wherein the heat output is greater than about 300 watts per meter of length of the heater below the selected temperature.

577. The heater of claim 559, wherein the ferromagnetic alloy comprises a turndown ratio of at least about 2 to 1.

578. The heater of claim 559, wherein the non-ferromagnetic material comprises copper.

579. The heater of claim 559, wherein the electrical conductor, the electrical insulator, and the sheath are portions of an insulated conductor heater.

580. The heater of claim 559, wherein a thickness of the ferromagnetic alloy is at least about ¾ of a skin depth of the AC at the Curie temperature of the ferromagnetic alloy.

581. The heater of claim 559, wherein the sheath comprises steel.

582. The heater of claim 559, wherein the sheath comprises copper and steel.

583. A heater, comprising:

an electrical conductor configured to generate an electrically resistive heat output during application of AC to the electrical conductor, wherein the electrical conductor comprises an electrically resistive ferromagnetic material at least partially surrounding a non-ferromagnetic material such that the heater provides a reduced amount of heat above or near a selected temperature;

a conduit at least partially surrounding the electrical conductor; and

a centralizer configured to maintain a separation distance between the electrical conductor and the conduit.

584. The heater of claim 583, wherein the electrical conductor is formed by a coextrusion process that combines the ferromagnetic material and the non-ferromagnetic material.

585. The heater of claim 583, wherein the centralizer comprises silicon nitride.

586. The heater of claim 583, wherein the conduit comprises electrically conductive material.

587. The heater of claim 583, wherein the heater comprises one or more portions coupled together, wherein each portion comprises at least one section of the electrical conductor, and wherein at least one section of the electrical conductor has been coupled to at least another section of the electrical conductor using a weld.

588. The heater of claim 583, wherein the heater is configured to allow heat to transfer from the heater to a part of a subsurface formation to pyrolyze at least some hydrocarbons in the subsurface formation.

589. The heater of claim 583, wherein the heater is configured to be placed in an opening in a subsurface formation.

590. The heater of claim 583, wherein a resistance of the ferromagnetic material decreases above the selected temperature such that the heater provides the reduced amount of heat above the selected temperature.

591. The heater of claim 583, further comprising a second ferromagnetic material coupled to the ferromagnetic material.

592. The heater of claim 583, wherein the selected temperature is approximately the Curie temperature of the ferromagnetic material.

593. The heater of claim 583, wherein the ferromagnetic material comprises iron.

594. The heater of claim 583, wherein the reduced amount of heat is less than about 400 watts per meter of length of the heater.

595. The heater of claim 583, wherein the heat output below the selected temperature is greater than about 400 watts per meter of length of the heater.

596. The heater of claim 583, wherein the heater comprises a relatively flat AC resistance profile in a temperature range between about 100 °C and 750 °C.

597. The heater of claim 583, wherein at least a portion of the heater is longer than about 10 m.

598. The heater of claim 583, wherein the ferromagnetic material comprises a turndown ratio of at least about 2 to 1.

599. The heater of claim 583, wherein the non-ferromagnetic material comprises copper.

600. A method of heating a subsurface formation, comprising:

providing AC to an electrical conductor to provide an electrically resistive heat output, wherein the electrical conductor comprises an electrically resistive ferromagnetic material at least partially surrounding a non-ferromagnetic material such that the electrical conductor provides a reduced amount of heat above or near a selected temperature, wherein a conduit at least partially surrounds the electrical conductor, and wherein a centralizer maintains a separation distance between the electrical conductor and the conduit; and

allowing heat to transfer from the electrical conductor to at least part of the subsurface formation.

601. The method of claim 600, wherein the AC provided to the electrical conductor has a frequency between about 100 Hz and about 1000 Hz.

602. The method of claim 600, wherein the reduced amount of heat is provided without adjusting the amperage of the AC applied to the electrical conductor.

603. The method of claim 600, further comprising providing an initial electrically resistive heat output when the electrical conductor providing the heat output is at least about 50 °C below the selected temperature, and automatically providing the reduced amount of heat above or near the selected temperature.

604. The method of claim 600, further comprising placing the electrical conductor in a wellbore in the subsurface formation.

605. The method of claim 600, wherein heat output from the electrical conductor is substantially constant when a temperature of the electrical conductor is between about 100 °C and 750 °C.

606. The method of claim 600, wherein an AC resistance of the electrical conductor decreases above the selected temperature to provide the reduced amount of heat.

607. The method of claim 600, wherein a thickness of the ferromagnetic material is at least about 3/4 of a skin depth of the AC at the Curie temperature of the ferromagnetic material.

608. The method of claim 600, further comprising providing a reduced amount of heat above or near the selected temperature of less than about 400 watts per meter of length of the electrical conductor.

609. The method of claim 600, further comprising controlling a skin depth in the electrical conductor by controlling a frequency of the AC applied to the electrical conductor.

610. The method of claim 600, further comprising controlling the heat applied from the electrical conductor by allowing less heat to be applied from any part of the electrical conductor that is at or near the selected temperature.

611. The method of claim 600, further comprising applying current of at least about 70 amps to the electrical conductor.

612. A heater, comprising:

an electrical conductor configured to generate an electrically resistive heat output when AC is applied to the electrical conductor, wherein the electrical conductor comprises an electrically resistive ferromagnetic material at least partially surrounding a non-ferromagnetic material, and wherein the ferromagnetic material is configured to provide a reduced amount of heat above or near a selected temperature that is about 20% or less of the heat output at about 50 °C below the selected temperature;

a conduit at least partially surrounding the electrical conductor; and

a centralizer configured to maintain a separation distance between the electrical conductor and the conduit.

613. The heater of claim 612, wherein the centralizer comprises silicon nitride.

614. The heater of claim 612, wherein the heater comprises one or more portions coupled together, wherein each portion comprises at least one section of the electrical conductor, and wherein at least one section of the electrical conductor has been coupled to at least another section of the electrical conductor using a weld.

615. The heater of claim 612, wherein a resistance of the ferromagnetic material decreases above the selected temperature such that the heater provides the reduced amount of heat above the selected temperature.

616. The heater of claim 612, further comprising a second ferromagnetic material coupled to the ferromagnetic material.

617. The heater of claim 612, wherein the selected temperature is approximately the Curie temperature of the ferromagnetic material.

618. The heater of claim 612, wherein the ferromagnetic material comprises iron.

619. The heater of claim 612, wherein the reduced amount of heat is less than about 400 watts per meter of length of the heater.

620. The heater of claim 612, wherein the heat output below the selected temperature is greater than about 400 watts per meter of length of the heater.

621. The heater of claim 612, wherein the heater comprises a relatively flat AC resistance profile in a temperature range between about 100 °C and 750 °C.

622. The heater of claim 612, wherein at least a portion of the heater is longer than about 10 m.

623. The heater of claim 612, wherein the ferromagnetic material comprises a turndown ratio of at least about 2 to 1.

624. The heater of claim 612, wherein the non-ferromagnetic material comprises copper.

625. A system configured to heat a part of a hydrocarbon containing formation, comprising:

a conduit configured to be placed in an opening in the formation, wherein the conduit is configured to allow fluids to be produced from the formation;

one or more electrical conductors configured to be placed in the opening in the formation, wherein at least one of the electrical conductors comprises a heater section, the heater section comprising an electrically resistive ferromagnetic material configured to provide an electrically resistive heat output when AC is applied to the ferromagnetic material, wherein the ferromagnetic material provides a reduced amount of heat above or near a selected temperature

during use, and wherein the reduced heat output inhibits a temperature rise of the ferromagnetic material above a temperature that causes undesired degradation of hydrocarbon material adjacent to the ferromagnetic material; and

wherein the system is configured to allow heat to transfer from the heater section to a part of the formation such that the heat reduces the viscosity of fluids in the formation and/or fluids at, near, and/or in the opening.

626. The system of claim 625, wherein one or more of the electrical conductors are located inside the conduit.

627. The system of claim 625, wherein one or more of the electrical conductors are located inside the conduit, and wherein such electrical conductors comprise an inner conduit configured to allow fluids to propagate through the inner conduit.

628. The system of claim 625, wherein the system is configured to allow a gas to be provided to the opening, and wherein the gas is configured to reduce the density of fluids to facilitate production of the fluids from the formation.

629. The system of claim 625, further comprising a pump configured to produce fluids from the opening.

630. The system of claim 625, wherein the system is configured to reduce the viscosity of fluids in the formation to less than about 50 centipoise.

631. The system of claim 625, wherein the system is configured such that the ferromagnetic material automatically provides a selected reduced amount of heat above or near the selected temperature.

632. The system of claim 625, wherein the system is configured such that the AC resistance of the ferromagnetic material decreases when the temperature of ferromagnetic material is near or above the selected temperature.

633. The system of claim 625, wherein at least one of the electrical conductors is configured to exhibit an increase in operating temperature of less than about 1.5 °C above or near a selected operating temperature when a thermal load proximate such electrical conductor decreases by about 1 watt per meter of the electrical conductor.

634. The system of claim 625, further comprising a highly electrically conductive material coupled to at least a portion of the ferromagnetic material of an electrical conductor, wherein AC applied to the electrical conductor substantially flows through the ferromagnetic conductor when a temperature of the ferromagnetic conductor is below the selected temperature, and wherein the AC applied to the conductor is configured to flow through the highly electrically conductive material when the temperature of the ferromagnetic conductor is near or above the selected temperature.

635. The system of claim 625, wherein at least one of the electrical conductors is configured to provide a reduced amount of heat above or near the selected temperature that is about 20% or less of the heat output at about 50 °C below the selected temperature.

636. The system of claim 625, wherein at least one of the electrical conductors is configured such that a decreased AC resistance through such electrical conductor above or near the selected temperature is about 20% or less than the electrical resistance at about 50 °C below the selected temperature.

637. The system of claim 625, wherein an AC resistance of at least one of the electrical conductors above or near the selected temperature is about 80% or less of an AC resistance at about 50 °C below the selected temperature.

638. The system of claim 625, wherein the system is configured such that an AC resistance of the ferromagnetic material decreases above the selected temperature to provide the reduced amount of heat.

639. The system of claim 625, further comprising a non-ferromagnetic material coupled to the ferromagnetic material, wherein the non-ferromagnetic material has a higher electrical conductivity than the ferromagnetic material.

640. The system of claim 625, wherein the selected temperature is approximately the Curie temperature of the ferromagnetic material.

641. The system of claim 625, wherein the selected temperature is less than about 300 °C.

642. The system of claim 625, wherein the system is configured to limit a temperature in the formation at or near the wellbore to less than about 250 °C.

643. The system of claim 625, wherein the reduced amount of heat is less than about 200 watts per meter of length of the electrical conductor.

644. The system of claim 625, wherein heat output from the ferromagnetic material is greater than about 300 watts per meter of length of the electrical conductor when the temperature of the ferromagnetic material is below the selected temperature during use.

645. The system of claim 625, wherein the ferromagnetic material has a turndown ratio of at least about 2 to 1.

646. The system of claim 625, wherein the ferromagnetic material comprises iron, nickel, chromium, or a mixture thereof.

647. The system of claim 625, wherein the system is configured such that the ferromagnetic material has a thickness of at least about 3/4 of a skin depth of AC at the Curie temperature of the ferromagnetic material.

648. The system of claim 625, wherein at least one of the electrical conductors comprises ferromagnetic material and non-ferromagnetic electrically conductive material.

649. The system of claim 625, wherein the hydrocarbon containing formation comprises a relatively permeable formation containing heavy hydrocarbons.

650. The system of claim 625, wherein the electrically resistive ferromagnetic material is elongated and at least a portion of the ferromagnetic material is longer than about 10 m.

651. The system of claim 625, wherein the system is configured to sharply reduce the heat output at or near the selected temperature.

652. The system of claim 625, wherein at least one of the electrical conductors is elongated and configured such that only electrically resistive sections at or near the selected temperature will automatically reduce the heat output.

653. The system of claim 625, wherein the system is configured such that an AC resistance of at least one of the electrical conductors increases with an increase in temperature up to the selected temperature.

654. The system of claim 625, wherein the system is configured such that an AC resistance of at least one of the electrical conductors decreases with an increase in temperature above the selected temperature.

655. The system of claim 625, wherein the system is configured such that at least about 70 amps is applied to at least one of the electrical conductors.

656. The system of claim 625, wherein the system is configured such that a frequency of the AC is about 180 Hz.

657. The system of claim 625, wherein the system is configured such that a frequency of the AC is about 60 Hz.

658. The system of claim 625, wherein the ferromagnetic material is positioned in the opening in the formation, and wherein at least a portion of the opening in the formation adjacent to the ferromagnetic material comprises one or more openings for allowing fluids to enter the wellbore.

659. A method for treating a hydrocarbon containing formation, comprising:

applying AC to one or more electrical conductors located in an opening in the formation to provide an electrically resistive heat output, wherein at least one of the electrical conductors comprises an electrically resistive ferromagnetic material that provides heat when AC flows through the electrically resistive ferromagnetic material, and wherein the electrically resistive ferromagnetic material provides a reduced amount of heat above or near a selected temperature;

allowing the heat to transfer from the electrically resistive ferromagnetic material to a part of the formation so that a viscosity of fluids at or near the opening in the formation is reduced; and

producing the fluids through the opening.

660. The method of claim 659, wherein the ferromagnetic material automatically provides the reduced amount of heat above or near the selected temperature.

661. The method of claim 659, further comprising placing the one or more electrical conductors in the opening.

662. The method of claim 659, further comprising providing an initial electrically resistive heat output when the electrical conductor providing the heat output is at least about 50 °C below the selected temperature, and automatically providing the reduced amount of heat above or near the selected temperature.

663. The method of claim 659, wherein the viscosity of fluids at or near the opening is reduced to less than about 50 centipoise.

664. The method of claim 659, further comprising providing a gas to the opening that reduces the density of the fluids so that the fluids are pushed out of the opening to the surface of the formation by the formation pressure.

665. The method of claim 659, further comprising producing the fluids from the opening by pumping the fluids from the opening.

666. The method of claim 659, further comprising producing the fluids from the opening through the electrical conductors.

667. The method of claim 659, further comprising producing the fluids from the opening through a conduit located in the opening.

668. The method of claim 659, further comprising limiting a temperature in the formation at or near the opening to less than about 250 °C.

669. The method of claim 659, wherein the electrically resistive ferromagnetic material automatically provides a selected reduced amount of heat above or near a selected temperature.

670. The method of claim 659, wherein an AC resistance of the ferromagnetic material decreases above the selected temperature to provide the reduced amount of heat.

671. The method of claim 659, wherein a thickness of the ferromagnetic material is greater than about ¾ of a skin depth of the AC at the Curie temperature of the ferromagnetic material.

672. The method of claim 659, wherein the selected temperature is approximately the Curie temperature of the ferromagnetic material.

673. The method of claim 659, wherein the selected temperature is less than about 300 °C.

674. The method of claim 659, further comprising providing a reduced amount of heat above or near the selected temperature of less than about 200 watts per meter of length of an electrical conductor.

675. The method of claim 659, further comprising providing a heat output below the selected temperature of greater than about 300 watts per meter of length of an electrical conductor.

676. The method of claim 659, further comprising controlling the amount of current applied to the electrical conductors to control the amount of heat provided by the ferromagnetic material.

677. The method of claim 659, further comprising applying an AC of at least about 70 amps to the electrical conductors.

678. The method of claim 659, further comprising providing a heat output from at least one of the electrical conductors, wherein an AC resistance of such electrical conductors above or near the selected temperature is about 80% or less of the AC resistance of such electrical conductors at about 50 °C below the selected temperature.

679. The method of claim 659, further comprising controlling a skin depth in the ferromagnetic material by controlling a frequency of the applied AC.

680. The method of claim 659, further comprising increasing the AC applied to at least one of the electrical conductors as the temperature of such electrical conductors increases, and continuing to do so until the temperature is at or near the selected temperature.

681. The method of claim 659, further comprising controlling an amount of current applied to at least one of the electrical conductors to control an amount of heat output from such electrical conductors.

682. The method of claim 659, further comprising increasing an amount of current applied to at least one of the electrical conductors to decrease an amount of heat output from such electrical conductors.

683. The method of claim 659, further comprising decreasing an amount of current applied to at least one of the electrical conductors to increase an amount of heat output from such electrical conductors.

684. The method of claim 659, wherein the hydrocarbon containing formation comprises a relatively permeable formation containing heavy hydrocarbons.

685. A method for treating a hydrocarbon containing formation, comprising:

applying AC to one or more electrical conductors located in an opening in the formation to provide an electrically resistive heat output, wherein at least one of the electrical conductors comprises an electrically resistive ferromagnetic material that provides heat when AC flows through the electrically resistive ferromagnetic material, and wherein the electrically resistive ferromagnetic material provides a reduced amount of heat above or near a selected temperature;

allowing the heat to transfer from the electrically resistive ferromagnetic material to a part of the formation to enhance radial flow of fluids from portions of the formation surrounding the opening to the opening; and

producing the fluids through the opening.

686. The method of claim 685, wherein the ferromagnetic material automatically provides the reduced amount of heat above or near the selected temperature.

687. The method of claim 685, further comprising placing one or more of the electrical conductors in the opening.

688. The method of claim 685, further comprising providing an initial electrically resistive heat output when the electrical conductor providing the heat output is at least about 50 °C below

the selected temperature, and automatically providing the reduced amount of heat above or near the selected temperature.

689. The method of claim 685, wherein the viscosity of fluids at or near the opening is reduced to less than about 50 centipoise.

690. The method of claim 685, further comprising producing the fluids from the opening by pumping the fluids from the opening.

691. The method of claim 685, further comprising producing the fluids from the opening through the electrical conductors.

692. The method of claim 685, further comprising producing the fluids from the opening through a conduit located in the opening.

693. The method of claim 685, further comprising limiting a temperature in the formation at or near the opening to less than about 250 °C.

694. The method of claim 685, wherein the electrically resistive ferromagnetic material automatically provides a selected reduced amount of heat above or near a selected temperature.

695. The method of claim 685, wherein an AC resistance of the ferromagnetic material decreases above the selected temperature to provide the reduced amount of heat.

696. The method of claim 685, wherein a thickness of the ferromagnetic material is greater than about ¾ of a skin depth of AC at the Curie temperature of the ferromagnetic material.

697. The method of claim 685, wherein the selected temperature is approximately the Curie temperature of the ferromagnetic material.

698. The method of claim 685, wherein the selected temperature is less than about 300 °C.

699. The method of claim 685, further comprising providing a reduced amount of heat above or near the selected temperature of less than about 200 watts per meter of length of an electrical conductor.

700. The method of claim 685, further comprising providing a heat output below the selected temperature of greater than about 300 watts per meter of length of an electrical conductor.

701. The method of claim 685, further comprising controlling the amount of current applied to the electrical conductors to control the amount of heat provided by the ferromagnetic material.

702. The method of claim 685, further comprising applying an AC of at least about 70 amps to the electrical conductors.

703. The method of claim 685, further comprising providing a heat output from at least one of the electrical conductors, wherein an AC resistance of such electrical conductors above or near the selected temperature is about 80% or less of the AC resistance of such electrical conductors at about 50 °C below the selected temperature.

704. The method of claim 685, further comprising controlling a skin depth in the ferromagnetic material by controlling a frequency of the applied AC.

705. The method of claim 685, further comprising increasing the amount of AC applied to at least one of the electrical conductors as the temperature of such electrical conductors increases, and continuing to do so until the temperature is at or near the selected temperature.

706. The method of claim 685, further comprising controlling an amount of current applied to at least one of the electrical conductors to control an amount of heat output from such electrical conductors.

707. The method of claim 685, further comprising increasing an amount of current applied to at least one of the electrical conductors to decrease an amount of heat output from such electrical conductors.

708. The method of claim 685, further comprising decreasing an amount of current applied to at least one of the electrical conductors to increase an amount of heat output from such electrical conductors.

709. The method of claim 685, wherein the hydrocarbon containing formation comprises a relatively permeable formation containing heavy hydrocarbons.

710. A method for heating a hydrocarbon containing formation, comprising:

applying AC to one or more electrical conductors placed in an opening in the formation, wherein at least one of the electrical conductors comprises one or more electrically resistive sections;

providing a heat output from at least one of the electrically resistive sections, wherein such electrically resistive sections provide a reduced amount of heat above or near a selected temperature that is about 20% or less of the heat output at about 50 °C below the selected temperature;

allowing the heat to transfer from at least one of the electrically resistive sections to at least a part of the formation such that a temperature in the formation at or near the opening is maintained between about 150 °C and about 250 °C to reduce a viscosity of fluids at or near the opening in the formation; and

producing the reduced viscosity fluids through the opening.

711. The method of claim 710, wherein the viscosity of fluids at or near the opening is reduced to less than about 50 centipoise.

712. The method of claim 710, further comprising placing one or more of the electrical conductors in the opening.

713. The method of claim 710, further comprising providing an initial electrically resistive heat output when the electrically resistive section providing the heat output is at least about 50 °C below the selected temperature, and automatically providing the reduced amount of heat above or near the selected temperature.

714. The method of claim 710, further comprising providing a gas to the opening that reduces the density of the reduced viscosity fluids so that the reduced viscosity fluids are pushed out of the opening to the surface of the formation by the formation pressure.

715. The method of claim 710, further comprising producing the reduced viscosity fluids from the opening by pumping the reduced viscosity fluids from the opening.

716. The method of claim 710, further comprising producing the reduced viscosity fluids from the opening through the electrical conductors.

717. The method of claim 710, further comprising producing the reduced viscosity fluids from the opening through a conduit located in the opening.

718. The method of claim 710, further comprising providing a reduced amount of heat above or near the selected temperature that is less than about 20% of the heat output at about 40 °C below the selected temperature.

719. The method of claim 710, further comprising providing a reduced amount of heat above or near the selected temperature that is less than about 20% of the heat output at about 30 °C below the selected temperature.

720. The method of claim 710, further comprising providing a reduced amount of heat above or near the selected temperature that is less than about 15% of the heat output at about 50 °C below the selected temperature.

721. The method of claim 710, further comprising providing a reduced amount of heat above or near the selected temperature that is less than about 10% of the heat output at about 50 °C below the selected temperature.

722. The method of claim 710, wherein at least one electrically resistive section comprises ferromagnetic material, and wherein the selected temperature is approximately the Curie temperature of the ferromagnetic material.

723. The method of claim 710, wherein the selected temperature is less than about 300 °C.

724. The method of claim 710, further comprising automatically decreasing an AC resistance of at least one of the electrically resistive sections when such electrically resistive sections are above the selected temperature to provide the reduced amount of heat above the selected temperature.

725. The method of claim 710, further comprising providing a reduced amount of heat above or near the selected temperature of less than about 200 watts per meter of length of an electrical conductor.

726. The method of claim 710, further comprising applying AC of at least about 70 amps to at least one of the electrical conductors.

727. The method of claim 710, wherein the hydrocarbon containing formation comprises a relatively permeable formation containing heavy hydrocarbons.

728. The method of claim 710, wherein the electrically resistive sections are configured to automatically provide the reduced amount of heat above or near the selected temperature.

729. The method of claim 710, wherein the electrically resistive sections automatically provide a selected reduced amount of heat above or near a selected temperature.

730. A system for treating a formation in situ, comprising:

five or more oxidizers configured to be placed in an opening in the formation;

one or more conduits, wherein at least one of the conduits is configured to provide at least oxidizing fluid to the oxidizers, and wherein at least one of the conduits is configured to provide at least fuel to the oxidizers;

wherein the oxidizers are configured to allow combustion of a mixture of the fuel and the oxidizing fluid to produce heat and exhaust gas; and

wherein the oxidizers and the conduit configured to provide at least the oxidizing fluid to the oxidizers are configured such that at least a portion of exhaust gas from at least one of the oxidizers is mixed with at least a portion of the oxidizing fluid provided to at least another one of the oxidizers.

731. The system of claim 730, wherein the system comprises ten or more oxidizers configured to be placed in the opening in the formation.

732. The system of claim 730, further comprising a flameless distributed combustors placed in the opening in the formation.

733. The system of claim 730, wherein at least one of the oxidizers comprises a mixing chamber, and wherein the mixing chamber comprises orifices.

734. The system of claim 730, wherein at least one of the oxidizers comprises a mixing chamber, and wherein the mixing chamber comprises at least one static mixer.

735. The system of claim 730, wherein at least one of the oxidizers comprises a constriction configured to increase a flow velocity of the mixture of the fuel and the oxidizing fluid.

736. The system of claim 730, wherein at least one of the oxidizers comprises a mixing chamber and a screen, and wherein the screen is configured such that a flow velocity of fluid through the mixing chamber exceeds a flow velocity of fluid through the screen.

737. The system of claim 730, wherein at least one of the oxidizers comprises a mixing chamber and a screen, and wherein an effective diameter of the screen exceeds an effective diameter of the mixing chamber.

738. The system of claim 730, wherein at least one of the oxidizers comprises a screen, and wherein the screen comprises openings.

739. The system of claim 730, wherein at least one of the oxidizers is positioned in the conduit configured to provide at least oxidizing fluid to the oxidizers.

740. The system of claim 730, wherein a spacing between a terminal oxidizer and the oxidizer adjacent to the terminal oxidizer exceeds a spacing between other pairs of adjacent oxidizers in the system.

741. The system of claim 730, wherein a terminal oxidizer is a catalytic oxidizer.

742. The system of claim 730, wherein a terminal oxidizer is configured to reach a higher peak temperature than the other oxidizers in the system.

743. The system of claim 730, wherein a terminal oxidizer is configured to consume more oxidizing fluid than each of the other oxidizers in the system.

744. The system of claim 730, wherein a terminal oxidizer is configured to oxidize more fuel than each of the other oxidizers in the system.

745. The system of claim 730, wherein the one or more conduits comprise a fuel conduit and an oxidizer conduit, and wherein the fuel conduit is positioned substantially concentrically in the oxidizer conduit.

746. The system of claim 730, wherein the one or more conduits comprise a fuel conduit and an oxidizer conduit, and wherein the fuel conduit and the oxidizers are positioned substantially concentrically in the oxidizer conduit.

747. The system of claim 730, wherein the one or more conduits comprise a fuel conduit and an oxidizer conduit, and wherein the fuel conduit is substantially parallel to the oxidizer conduit.

748. The system of claim 730, wherein the one or more conduits comprise a fuel conduit and an oxidizer conduit, wherein the fuel conduit is substantially parallel to the oxidizer conduit, and wherein the oxidizers are positioned between the fuel conduit and the oxidizer conduit.

749. The system of claim 730, wherein the conduit configured to provide at least the fuel to the oxidizers comprises a catalytic inner surface.

750. The system of claim 730, wherein the conduit configured to provide at least the fuel to the oxidizers is further configured such that at least a portion of exhaust gas from at least one of the oxidizers is mixed with at least a portion of the fuel provided to at least another one of the oxidizers.

751. The system of claim 730, wherein the conduit configured to provide at least the fuel to the oxidizers is further configured such that at least a portion of exhaust gas from at least one of the oxidizers is mixed with at least a portion of the fuel provided to at least another one of the oxidizers.

752. The system of claim 730, further comprising a venturi device coupled to the conduit configured to provide at least the fuel to the oxidizers, wherein the venturi device is configured to provide at least a portion of the exhaust gas from at least one of the oxidizers to the conduit configured to provide at least the fuel to the oxidizers, and wherein the venturi device is further configured to increase a velocity of the fuel flow.

753. The system of claim 730, further comprising a valve coupled to the conduit configured to provide at least the fuel to the oxidizers, wherein the valve is configured to control fuel flow to at least one of the oxidizers.

754. The system of claim 730, further comprising a valve coupled to the conduit configured to provide at least the fuel to the oxidizers, wherein the valve is configured to control fuel flow to at least one of the oxidizers, and wherein the valve is a self-regulating valve.

755. The system of claim 730, wherein one or more of the conduits are configured such that at least a portion of the exhaust gas heats at least a portion of the formation.

756. The system of claim 730, further comprising a membrane positioned in the conduit configured to provide at least oxidizing fluid to the oxidizers, wherein the membrane is configured to increase a concentration of oxygen in the oxidizing fluid.

757. The system of claim 730, further comprising a membrane positioned in the conduit configured to provide at least oxidizing fluid to the oxidizers, wherein the membrane is configured to increase a concentration of oxygen in the oxidizing fluid, and wherein the system is further configured to allow heat to transfer from the exhaust gas to the membrane to increase a concentration of oxygen in the oxidizing fluid.

758. The system of claim 730, further comprising one or more ignition sources proximate at least one of the oxidizers.

759. The system of claim 730, further comprising one or more ignition sources proximate at least one of the oxidizers, and wherein at least one of the oxidizers comprises a catalytic surface proximate one of the ignition sources.

760. The system of claim 730, further comprising one or more ignition sources proximate at least one of the oxidizers, wherein at least of the ignition sources comprises an electrical ignition source.

761. The system of claim 730, further comprising one or more ignition sources proximate at least one of the oxidizers, wherein at least one of the ignition sources comprises a spark plug, and wherein a voltage of less than about 3000 V is provided to the spark plug.

762. The system of claim 730, further comprising one or more ignition sources proximate at least one of the oxidizers, wherein at least one of the ignition sources comprises a spark plug, and wherein a voltage of less than about 1000 V is provided to the spark plug.

763. The system of claim 730, further comprising one or more ignition sources proximate at least one of the oxidizers, wherein at least one of the ignition sources comprises a glow plug.

764. The system of claim 730, further comprising one or more ignition sources proximate at least one of the oxidizers, wherein at least one of the ignition sources comprises a glow plug, and wherein a voltage of less than about 1000 V is provided to the glow plug.

765. The system of claim 730, further comprising one or more ignition sources proximate at least one of the oxidizers, wherein at least one of the ignition sources comprises a glow plug, and wherein a voltage of less than about 630 V is provided to the glow plug.

766. The system of claim 730, further comprising one or more ignition sources proximate at least one of the oxidizers, wherein at least one of the ignition sources comprises a glow plug, and wherein a voltage of less than about 120 V is provided to the glow plug.

767. The system of claim 730, further comprising one or more ignition sources proximate at least one of the oxidizers, wherein at least one of the ignition sources comprises a glow plug, and wherein a voltage between about 10 V and about 120 V is provided to the glow plug.

768. The system of claim 730, further comprising one or more ignition sources proximate at least one of the oxidizers, wherein at least one of the ignition sources comprises a catalytic glow plug.

769. The system of claim 730, further comprising one or more ignition sources proximate at least one of the oxidizers, wherein at least one of the ignition sources comprises a temperature limited heater.

770. The system of claim 730, further comprising one or more ignition sources proximate at least one of the oxidizers, wherein at least one of the ignition sources comprises a cable with one or more igniter sections.

771. The system of claim 730, further comprising one or more ignition sources proximate at least one of the oxidizers, wherein at least one of the ignition sources comprises a cable with one or more igniter sections, and wherein at least one of the igniter sections comprises a temperature limited heater.

772. The system of claim 730, further comprising one or more ignition sources proximate at least one of the oxidizers, wherein at least one of the ignition sources comprises a ferromagnetic material.

773. The system of claim 730, further comprising one or more ignition sources proximate at least one of the oxidizers, wherein at least one of the ignition sources comprises a mechanical ignition source.

774. The system of claim 730, further comprising one or more ignition sources proximate at least one of the oxidizers, wherein at least one of the ignition sources comprises a mechanical ignition source, and wherein the mechanical ignition source is configured to be driven by a fluid.

775. The system of claim 730, further comprising one or more ignition sources proximate at least one of the oxidizers, wherein at least one of the ignition sources comprises a mechanical ignition source, and wherein the mechanical ignition source includes a flint stone.

776. The system of claim 730, further comprising one or more ignition sources proximate at least one of the oxidizers, wherein at least one of the ignition sources comprises an electrical generator.

777. The system of claim 730, further comprising one or more ignition sources proximate at least one of the oxidizers, wherein at least one of the ignition sources comprises an electrical generator, and wherein the electrical generator is configured to be driven by a fluid.

778. The system of claim 730, further comprising one or more ignition sources proximate at least one of the oxidizers, wherein at least one of the ignition sources comprises a pilot light.

779. The system of claim 730, further comprising one or more ignition sources proximate at least one of the oxidizers, wherein at least one of the ignition sources comprises a fireball.

780. The system of claim 730, further comprising one or more ignition sources proximate at least one of the oxidizers, wherein at least one of the ignition sources comprises a flame front.

781. The system of claim 730, further comprising one or more ignition sources proximate at least one of the oxidizers, wherein at least one of the ignition sources comprises a fireflood.

782. The system of claim 730, further comprising one or more ignition sources proximate at least one of the oxidizers, wherein at least one of the ignition sources comprises catalytic material.

783. The system of claim 730, further comprising one or more ignition sources proximate at least one of the oxidizers, wherein at least one of the ignition sources comprises a pyrophoric fluid provided proximate such oxidizers.

784. The system of claim 730, further comprising one or more ignition sources proximate at least one of the oxidizers, wherein at least one of the ignition sources comprises a pellet launching system, one or more explosive pellets, and one or more points of ignition.

785. A method of treating a formation in situ, comprising:

providing fuel to a series of oxidizers positioned in an opening in the formation;

providing oxidizing fluid to the series of oxidizers positioned in the opening in the formation;

mixing at least a portion of the fuel with at least a portion of the oxidizing fluid to form a fuel/oxidizing fluid mixture;

igniting the fuel/oxidizing fluid mixture at or near the oxidizers;

allowing the fuel/oxidizing fluid mixture to react in the oxidizers to produce heat and exhaust gas;

mixing at least a portion of the exhaust gas from one or more of the oxidizers with the oxidizing fluid provided to another one or more of the oxidizers; and

allowing heat to transfer from the exhaust gas to a portion of the formation.

786. The method of claim 785, further comprising establishing a pyrolysis zone in at least a portion of the formation.

787. The method of claim 785, further comprising mixing at least a portion of the exhaust gas with at least a portion of the fuel provided to at least one of the oxidizers.

788. The method of claim 785, further comprising introducing at least a portion of the exhaust gas into a flow of at least a portion of the oxidizing fluid to increase a flow velocity of the oxidizing fluid.

789. The method of claim 785, further comprising enriching the oxidizing fluid to increase an oxygen content of the oxidizing fluid.

790. The method of claim 785, further comprising controlling a flow rate of fuel to at least one of the oxidizers.

791. The method of claim 785, further comprising controlling a flow rate of oxidizing fluid to at least one of the oxidizers.

792. The method of claim 785, further comprising providing steam to the fuel to inhibit coking.

793. A system for treating a formation in situ, comprising:

one or more heater assemblies positionable in an opening in the formation, wherein each heater assembly comprises one or more heaters, and wherein the heaters are configured to transfer heat to the formation to establish a pyrolysis zone in the formation;

an optical sensor array positionable along a length of at least one of the heater assemblies, wherein the optical sensor array is configured to transmit one or more signals; and

one or more instruments configured to receive at least one of the signals transmitted by the optical sensor array.

794. The system of claim 793, wherein the optical sensor array is configured to operate when a temperature in the opening is up to about 700 °C.

795. The system of claim 793, wherein at least one heater assembly comprises an oxidizer positioned in the opening in the formation, and further comprising one or more ignition sources configured to ignite at least one of the oxidizers, and wherein at least one of the instruments is configured to monitor at least one of the oxidizers to determine if such oxidizers are ignited.

796. The system of claim 793, wherein the oxidizers are configured such that heat from at least one of the ignited oxidizers ignites at least one of the oxidizers that is not ignited.

797. The system of claim 793, further comprising a control system in communication with one of the instruments and at least one of the ignition sources, wherein the control system is configured to activate one of the ignition sources to ignite at least one of the oxidizers based on the communication from the instrument.

798. The system of claim 793, further comprising a sleeve positionable adjacent one of the heater assemblies, wherein the optical sensor array is at least partially positionable in the sleeve.

799. The system of claim 793, wherein the optical sensor array comprises a high temperature resistant material.

800. The system of claim 793, wherein the optical sensor array comprises gold.

801. The system of claim 793, wherein the optical sensor array is a high temperature rated optical fiber.

802. The system of claim 793, wherein the optical sensor array is a high temperature rated fiber optic cable.

803. The system of claim 793, wherein at least one of the instruments is configured to analyze a Raman backscattering component of at least one of the signals.

804. The system of claim 793, wherein at least one of the instruments is configured to analyze a Brillouin backscattering component of at least one of the signals.

805. The system of claim 793, wherein at least one of the instruments is configured to analyze a Brillouin backscattering component of at least one of the signals and a Raman backscattering component of at least one of the signals.

806. The system of claim 793, wherein at least one of the instruments is configured to analyze a Rayleigh component of at least one of the signals.

807. The system of claim 793, further comprising a laser configured such that output from the laser is transmitted through the optical sensor array to produce a signal.

808. The system of claim 793, wherein at least one of the instruments is configured to provide a profile of pressure adjacent to at least one of the heater assemblies.

809. The system of claim.793 wherein at least one of the instruments is configured to provide a profile of temperature adjacent to at least one of the heater assemblies.

810. The system of claim 793, wherein at least one of the signals from at least one of the units indicates a temperature and a position of at least one heater in at least one of the heater assemblies.

811. The system of claim 793, wherein at least one of the signals from at least one of the units indicates temperature and strain at one or more locations along at least one of the heater assemblies.

812. The system of claim 793, wherein at least one of the signals from at least one of the units indicates temperature and pressure at one or more locations along at least one of the heater assemblies.

813. The system of claim 793, wherein at least one of the signals from at least one of the units indicates a gas composition at one or more locations along at least one of the heater assemblies.

814. The system of claim 793, further comprising a control system in communication with one of the instruments, wherein the control system is configured to control one or more operating parameters of at least one of the heater assemblies based on communication from at least one of the instruments.

815. A method of monitoring an environment in an opening in a formation, comprising:
providing heat from a heater assembly in the opening of the formation;
repetitively monitoring one or more parameters at two or more locations along a length of the heater assembly with a sensor array;

analyzing at least one of the parameters to assess conditions in the opening of the formation; and

using information from the analysis of at least one of the parameters to alter conditions in the opening of the formation.

816. The method of claim 815, wherein repetitively monitoring the one or more parameters comprises continuously monitoring the one or more parameters.

817. The method of claim 815, wherein the optical sensor array is used when a temperature in the opening is up to about 700 °C.

818. The method of claim 815, further comprising monitoring temperature.

819. The method of claim 815, further comprising monitoring pressure.

820. The method of claim S15, further comprising monitoring strain.

821. The method of claim 815, further comprising monitoring gas composition.

822. The method of claim 815, further comprising monitoring temperature and strain.

823. The method of claim 815, further comprising monitoring temperature and pressure.

824. A method for forming a wellbore in a hydrocarbon containing formation, comprising:

forming a first opening of the wellbore beginning at the earth's surface and ending underground;

forming a second opening of the wellbore beginning at the earth's surface and ending underground proximate the first opening; and

coupling the openings underground using an expandable conduit.

825. The method of claim 824, further comprising aligning the first opening and the second opening underground using magnetic tracking of a magnet source in the first opening.

826. The method of claim 824, wherein at least a portion of the wellbore is formed substantially horizontally in a hydrocarbon layer of the formation.

827. The method of claim 824, wherein the openings begin substantially in an overburden of the formation.

828. The method of claim 824, wherein the openings begin substantially in an overburden of the formation, and placing reinforcing material in the overburden portions of the openings.

829. The method of claim 824, further comprising forming the first opening by drilling from the earth's surface with machinery located proximate the location of the first opening.

830. The method of claim 824, further comprising coupling the first and second openings by placing an expandable conduit partially in the first opening, partially in the second opening, and in a space between the first and second openings, and then expanding the expandable conduit.

831. The method of claim 824, further comprising forming the second opening by drilling from the earth's surface with machinery located proximate the location of the second opening.

832. The method of claim 824, further comprising placing a casing in the first opening.

833. The method of claim 824, further comprising sealing the expandable conduit to the first opening and the second opening.

834. The method of claim 824, further comprising placing one or more heaters in the wellbore or coupling one or more heaters to the wellbore, wherein at least one of the heaters is configured to provide or transfer heat to at least part of the formation to pyrolyze at least some hydrocarbons in the formation.

835. The method of claim 834, wherein at least one of the heaters comprises one or more oxidizers located in the wellbore.

836. The method of claim 834, wherein at least one of the heaters comprises one or more oxidizers located on the earth's surface, wherein at least one of the oxidizers is coupled to the wellbore.

837. The method of claim 824, further comprising forming a second wellbore in the formation using, at least in part, a magnetic field produced in the wellbore, wherein the second wellbore begins and ends at different locations on the earth's surface.

838. The method of claim 824, further comprising forming at least part of the first opening at an angle with respect to the earth's surface, wherein the angle is between about 25° and about 90°.

839. The method of claim 824, further comprising forming at least part of the second opening at an angle with respect to the earth's surface, wherein the angle is between about 25° and about 90°.

840. A system configured to heat at least a part of a subsurface formation, comprising:

one or more electrical conductors configured to be placed in an opening in the formation, wherein at least one electrical conductor comprises at least one electrically resistive portion configured to provide a heat output when alternating current is applied through such electrically resistive portion, and wherein at least one of such electrically resistive portions comprises one or more ferromagnetic materials, and is configured, when above or near a selected temperature and when alternating current is applied, to inherently provide a reduced heat output; and

wherein the system is configured to allow heat to transfer from at least one of the electrically resistive portions to at least a part of the subsurface formation.

841. The system of claim 840, wherein at least one electrical conductor is configured to propagate electrical current out of the opening.

842. The system of claim 840, wherein at least one electrical conductor is configured to propagate electrical current into the opening.

843. The system of claim 840, wherein the subsurface formation comprises a hydrocarbon containing formation.

844. The system of claim 840, wherein the subsurface formation comprises a hydrocarbon containing formation, and wherein the system is configured to pyrolyze at least some hydrocarbons in the formation.

845. The system of claim 840, wherein the subsurface formation comprises contaminated soil.

846. The system of claim 840, wherein the subsurface formation comprises contaminated soil, and wherein the system is configured to remediate at least a portion of the contaminated soil.

847. The system of claim 840, wherein the system is configured to provide heat to at least a portion of the opening in the formation.

848. The system of claim 840, further comprising a deformation resistant container, wherein at least a portion of the system is located in the deformation resistant container, and wherein the selected temperature is selected such that the deformation resistant container has a creep-rupture strength of at least about 3000 psi at 100,000 hours at the selected temperature.

849. The system of claim 848, wherein the deformation resistant container comprises an alloy, and the alloy comprises iron, chromium, nickel, manganese, carbon, and tantalum.

850. The system of claim 840, wherein three or more electrical conductors are configured to be coupled in a three-phase electrical configuration.

851. The system of claim 840, wherein at least one electrical conductor comprises an inner conductor and at least one electrical conductor comprises an outer conductor.

852. The system of claim 840, further comprising an electrically insulating material placed between at least two electrical conductors.

853. The system of claim 852, wherein the electrically insulating material comprises ceramic.

854. The system of claim 840, further comprising an electrically insulating material, comprising a packed powder, placed between at least two electrical conductors.

855. The system of claim 840, further comprising a flexible electrically insulating material placed between at least two electrical conductors.

856. The system of claim 840, wherein at least one electrically resistive portion comprises an AC resistance that decreases at, near, or above the selected temperature such that the at least one electrically resistive portion provides the reduced heat output above the selected temperature.

857. The system of claim 840, wherein at least one ferromagnetic material comprises iron, nickel, chromium, cobalt, tungsten, or mixtures thereof.

858. The system of claim 840, wherein at least one ferromagnetic material has a thickness that is at least about ¾ of a skin depth of the alternating current at the Curie temperature of the ferromagnetic material.

859. The system of claim 840, wherein at least one ferromagnetic material has a thickness that is at least about ¾ of a skin depth of the alternating current at the Curie temperature of the ferromagnetic material, and wherein the ferromagnetic material is coupled to a more conductive material such that, at the Curie temperature of the ferromagnetic material, the electrically resistive portion has a higher conductivity than the electrically resistive portion would if the

ferromagnetic material were used, in the same or greater thickness, without the more conductive material.

860. The system of claim 840, wherein at least one electrically resistive portion comprises a first ferromagnetic material with a first Curie temperature, and a second ferromagnetic material with a second Curie temperature.

861. The system of claim 840, wherein at least one ferromagnetic material has a thickness that is at least about a skin depth of the alternating current at the Curie temperature of the ferromagnetic material.

862. The system of claim 840, wherein at least one ferromagnetic material has a thickness at least about 1.5 times greater than a skin depth of the alternating current at the Curie temperature of the ferromagnetic material.

863. The system of claim 840, wherein at least one ferromagnetic material is coupled to a higher conductivity material.

864. The system of claim 840, wherein at least one ferromagnetic material is coupled to a higher conductivity non-ferromagnetic material.

865. The system of claim 840, wherein the selected temperature is approximately the Curie temperature of at least one ferromagnetic material.

866. The system of claim 840, wherein at least one electrically resistive portion comprises ferromagnetic material and non-ferromagnetic electrically conductive material.

867. The system of claim 840, wherein the subsurface formation comprises a hydrocarbon containing formation, and wherein at least one electrically resistive portion is located proximate a relatively rich zone of the formation.

868. The system of claim 840, wherein at least one electrically resistive portion is located proximate a hot spot of the formation.

869. The system of claim 840, wherein at least one electrically resistive portion comprises carbon steel.

870. The system of claim 840, wherein at least one electrically resistive portion comprises iron.

871. The system of claim 840, wherein at least one ferromagnetic material is coupled to a corrosion resistant material.

872. The system of claim 840, further comprising a corrosion resistant material coated on at least one ferromagnetic material.

873. The system of claim 840, wherein the electrically resistive portion comprises one or more bends.

874. The system of claim 840, wherein the electrically resistive portion comprises a helically shaped portion.

875. The system of claim 840, wherein the electrically resistive portion is part of an insulated conductor heater.

876. The system of claim 840, wherein the electrically resistive portion comprises a thickness of ferromagnetic material, and such ferromagnetic material is coupled to a thickness of a more conductive material, and wherein the thickness of the ferromagnetic material and the thickness of the more conductive material have been selected such that the electrically resistive portion provides a selected resistance profile as a function of temperature.

877. The system of claim 840, wherein the electrically resistive portion comprises a thickness of a ferromagnetic material, and such ferromagnetic material comprises iron, nickel, chromium, cobalt, or mixtures thereof, and such ferromagnetic material is coupled to a thickness of a more conductive material, and wherein the thickness of the ferromagnetic material and the thickness of the more conductive material have been selected such that the electrically resistive portion provides a selected resistance profile as a function of temperature.

878. The system of claim 840, wherein the electrically resistive portion comprises a thickness of a ferromagnetic material, and such ferromagnetic material comprises a first Curie temperature material and a second Curie temperature material, and such ferromagnetic material is coupled to a thickness of a more conductive material, and wherein the thickness of the ferromagnetic material and the thickness of the more conductive material have been selected such that the electrically resistive portion provides a selected resistance profile as a function of temperature.

879. The system of claim 840, wherein the electrically resistive portion comprises a thickness of a ferromagnetic material, and such ferromagnetic material is coupled to a thickness of a more conductive material, and wherein the thickness and skin depth characteristics of the ferromagnetic material, and the thickness of the more conductive material, have been selected such that the electrically resistive portion provides a selected resistance profile as a function of temperature.

880. The system of claim 840, wherein the electrically resistive portion is part of an insulated conductor heater, and the insulated conductor heater is frictionally secured against a cased or open wellbore.

881. The system of claim 840, wherein the electrically resistive portion is part of a conductor-in-conduit heater.

882. The system of claim 840, wherein at least one electrical conductor is electrically coupled to the earth, and wherein electrical current is propagated from the electrical conductor to the earth.

883. The system of claim 840, wherein the reduced heat output is less than about 400 watts per meter.

884. The system of claim 840, wherein at least one electrical conductor comprises at least one section configured to comprise a relatively flat AC resistance profile in a temperature range between about 100 °C and 750 °C.

885. The system of claim 840, wherein at least one electrical conductor comprises at least one section configured to comprise a relatively flat AC resistance profile in a temperature range between about 100 °C and 700 °C, and a relatively sharp resistance profile at a temperature above about 700 °C and less than about 850 °C.

886. The system of claim 840, wherein at least one electrical conductor comprises at least one section configured to comprise a relatively flat AC resistance profile in a temperature range between about 300 °C and 600 °C.

887. The system of claim 840, wherein at least one electrical conductor is greater than about 10 m in length.

888. The system of claim 840, wherein at least one electrical conductor is greater than about 50 m in length.

889. The system of claim 840, wherein at least one electrical conductor is greater than about 100 m in length.

890. The system of claim 840, wherein the system is configured to reduce the heat output such that the system does not overheat in the opening.

891. The system of claim 840, wherein the system is configured to sharply reduce the heat output at or near the selected temperature.

892. The system of claim 840, wherein at least one electrically resistive portion comprises drawn iron.

893. The system of claim 840, wherein at least one electrically resistive portion comprises a ferromagnetic material drawn together or against a more conductive material.

894. The system of claim 840, wherein at least one electrically resistive portion comprises an elongated conduit comprising iron, wherein a center of the conduit is lined or filled with a material comprising copper or aluminum.

895. The system of claim 840, wherein at least one electrically resistive portion comprises an elongated conduit comprising iron, wherein a center of the conduit is filled with a material comprising stranded copper.

896. The system of claim 840, wherein at least one electrically resistive portion comprises an elongated conduit comprising iron, wherein a center of the conduit is lined or filled with a material comprising copper or aluminum, and wherein the copper or aluminum was melted in a center of the conduit and allowed to harden.

897. The system of claim 840, wherein at least one electrically resistive portion comprises an elongated conduit comprising a center portion and an outer portion, and wherein the diameter of the center portion is at least about 0.5 cm and comprises iron.

898. The system of claim 840, wherein at least one electrically resistive portion comprises an elongated conduit comprising a center portion and an outer portion.

899. The system of claim 840, wherein at least one electrically resistive portion comprises an elongated conduit comprising a center portion and an outer portion, wherein the center portion comprises a ferromagnetic material, and wherein a diameter of the center portion is at least about

¾ of a skin depth of the alternating current at the Curie temperature of the ferromagnetic material.

900. The system of claim 840, wherein at least one of the electrically resistive portions comprises a composite material, wherein the composite material comprises a first material that has a resistance that declines when heated to the selected temperature, and wherein the composite material includes a second material that is more electrically conductive than the first material, and wherein the first material is coupled to the second material.

901. The system of claim 840, wherein the system is configured such that, at or near the selected temperature, the heat output of at least a portion of the system declines due to the Curie effect of at least one ferromagnetic material.

902. The system of claim 840, wherein the heat output is reduced below the rate at which the formation will absorb or transfer heat, thereby inhibiting overheating of the formation.

903. The system of claim 840, wherein the electrically resistive portion comprises a magnetic material that, at or near the selected temperature, becomes substantially nonmagnetic.

904. The system of claim 840, wherein the electrically resistive portion is elongated, and configured such that only portions of the electrically resistive portion that are at or near the selected temperature will inherently reduce heat output.

905. The system of claim 840, wherein the system comprises a heater which in turn comprises one or more of the electrically resistive portions.

906. The system of claim 840, configured such that when a temperature of at least one electrically resistive portion is below the selected temperature, and such temperature increases, then an AC resistance of such electrically resistive portion increases.

907. The system of claim 840, configured such that when a temperature of at least one electrically resistive portion is above the selected temperature, and such temperature increases, then an AC resistance of such electrically resistive portion decreases.

908. The system of claim 840, configured that when a temperature of at least one electrically resistive portion is below the selected temperature, and such temperature increases, then an AC resistance of such electrically resistive portion gradually decreases.

909. The system of claim 840, configured such that when a temperature of at least one electrically resistive portion is above the selected temperature, and such temperature increases, then an AC resistance of such electrically resistive portion sharply decreases.

910. The system of claim 840, configured such that when a temperature of at least one electrically resistive portion is below the selected temperature, and such temperature increases, then an AC resistance of such electrically resistive portion increases, and when a temperature of at least one electrically resistive portion is above the selected temperature, and such temperature increases, then an AC resistance of such electrically resistive portion decreases.

911. The system of claim 840, configured such that when a temperature of at least one electrically resistive portion is below the selected temperature, and such temperature increases, then an AC resistance of such electrically resistive portion increases, and when a temperature of at least one electrically resistive portion is above the selected temperature, and such temperature increases, then an AC resistance of such electrically resistive portion decreases, and wherein the selected temperature is a temperature above the boiling point of water but below a failure temperature of one or more system components.

912. The system of claim 840, configured such that when a temperature of at least one electrically resistive portion is above the selected temperature, and such temperature increases, then an AC resistance of such electrically resistive portion gradually decreases.

913. The system of claim 840, wherein the amount of heat output provided from at least one electrically resistive portion is configured to be determined by the amount of current applied to such electrically resistive portion below the selected temperature.

914. The system of claim 840, wherein the amount of current applied to at least one electrically resistive portion is configured to be increased to decrease the amount of heat output from such electrically resistive portion below the selected temperature.

915. The system of claim 840, wherein the amount of current applied to at least one electrically resistive portion is configured to be decreased to increase the amount of heat output from such electrically resistive portion below the selected temperature.

916. The system of claim 840, wherein the amount of current applied to at least one electrically resistive portion is at least about 70 amps.

917. The system of claim 840, wherein the amount of current applied to at least one electrically resistive portion is at least about 100 amps.

918. The system of claim 840, wherein at least one electrically resistive portion comprises a turndown ratio of at least about 2 to 1.

919. The system of claim 840, wherein the applied current comprises alternating current operating at about 180 Hz AC frequency.

920. The system of claim 840, wherein the applied current comprises alternating current operating at about 60 Hz AC frequency.

921. The system of claim 840, wherein the opening comprises an uncased wellbore.

922. The system of claim 840, wherein the system is configured to radiatively heat the formation in the opening.

923. The system of claim 840, further comprising a fluid placed in the opening, wherein the system is configured to heat the fluid such that the fluid inhibits the opening from collapsing the system.

924. The system of claim 923, wherein the fluid comprises salt.

925. The system of claim 840, wherein the system is configured to withstand operating temperatures of about 250 °C or above.

926. The system of claim 840, wherein the system withstands operating temperatures of about 250 °C or above.

927. The system of claim 840, wherein at least one electrically resistive portion is located in an overburden of the formation.

928. The system of claim 840, wherein at least one electrically resistive portion located in an overburden of the formation is configured to inhibit fluid reflux in the overburden during use.

929. The system of claim 840, wherein at least one electrically resistive portion is coupled to a cable, and wherein the cable comprises a plurality of copper wires coated with an oxidation resistant alloy.

930. The system of claim 929, wherein the oxidation resistant alloy comprises stainless steel.

931. The system of claim 929, wherein the cable is a furnace cable.

932. The system of claim 929, wherein at least a portion of the cable is located inside at least a portion of an electrically resistive portion.

933. The system of claim 929, wherein the cable is electrically insulated with a material comprising mica.

934. The system of claim 929, wherein the cable is electrically insulated with a fiber comprising ceramic and mineral.

935. A method for heating a subsurface formation, comprising:

applying an alternating electrical current to one or more electrical conductors placed in an opening in the formation;

providing a heat output from at least one electrical conductor, wherein at least one electrical conductor comprises one or more electrically resistive portions, wherein at least one electrically resistive portion comprises one or more ferromagnetic materials, and wherein at least one of such electrically resistive portions is configured, when above or near a selected temperature, to inherently provide a reduced heat output; and

allowing the heat to transfer from one or more electrically resistive portions to at least a part of the formation.

936. The method of claim 935, further comprising applying the alternating electrical current to the one or more electrical conductors at about 180 Hz operating frequency.

937. The method of claim 935, wherein the heat is allowed to transfer radiatively from the one or more electrically resistive portions to at least a part of the formation.

938. The method of claim 935, wherein the selected temperature is approximately the Curie temperature of at least one ferromagnetic material.

939. The method of claim 935, further comprising providing a relatively constant heat output in a temperature range between about 300 °C and 600 °C.

940. The method of claim 935, further comprising providing a relatively constant heat output in a temperature range between about 100 °C and 750 °C.

941. The method of claim 935, wherein at least one electrically resistive portion comprises an AC resistance that decreases above the selected temperature such that the electrically resistive portion provides the reduced heat output above the selected temperature.

942. The method of claim 935, wherein at least one ferromagnetic material has a thickness of at least about ¾ of a skin depth of the alternating current at the Curie temperature of the ferromagnetic material.

943. The method of claim 935, wherein the subsurface formation comprises a hydrocarbon containing formation.

944. The method of claim 935, wherein the subsurface formation comprises a hydrocarbon containing formation, the method further comprising pyrolyzing at least some hydrocarbons in the formation.

945. The method of claim 935, wherein the subsurface formation comprises contaminated soil.

946. The method of claim 935, wherein the subsurface formation comprises contaminated soil, the method further comprising remediating at least a portion of the contaminated soil.

947. The method of claim 935, wherein the subsurface formation comprises a hydrocarbon containing formation, the method further comprising locating at least one electrically resistive portion proximate a relatively rich zone of the formation.

948. The method of claim 935, further comprising locating at least one electrically resistive portion proximate a hot spot of the formation.

949. The method of claim 935, wherein the subsurface formation comprises a hydrocarbon containing formation, the method further comprising producing a mixture from the formation,

wherein the produced mixture comprises condensable hydrocarbons having an API gravity of at least about 25°.

950. The method of claim 935, wherein the subsurface formation comprises a hydrocarbon containing formation, the method further comprising controlling a pressure within at least a part of the formation, wherein the controlled pressure is at least about 2.0 bars absolute.

951. The method of claim 935, wherein the subsurface formation comprises a hydrocarbon containing formation, the method further comprising controlling formation conditions such that a produced mixture comprises a partial pressure of H_2 within the mixture greater than about 0.5 bars.

952. The method of claim 935, wherein the subsurface formation comprises a hydrocarbon containing formation, the method further comprising altering a pressure within the formation to inhibit production of hydrocarbons from the formation having carbon numbers greater than about 25.

953. The method of claim 935, wherein the subsurface formation comprises a hydrocarbon containing formation, the method wherein at least a portion of the part of the formation is heated to a minimum pyrolysis temperature of about 270 °C.

954. The method of claim 935, wherein the reduced heat output is less than about 400 watts per meter.

955. The method of claim 935, further comprising controlling a skin depth in at least one electrically resistive portion by controlling a frequency of alternating current applied to at least one electrically resistive portion.

956. The method of claim 935, further comprising applying additional power to at least one electrically resistive portion as the temperature of the electrically resistive portion increases, and continuing to do so until the temperature is at or near the selected temperature.

957. The method of claim 935, wherein the subsurface formation contains at least two portions with different thermal conductivities, and further comprising applying heat to such portions with an electrically resistive portion that is proximate to such portions, and further comprising inherently allowing less heat to be applied from a part of an electrically resistive portion that is proximate a portion of the formation with a lower thermal conductivity.

958. The method of claim 935, wherein the subsurface formation contains at least two portions with different thermal conductivities, and further comprising applying heat to such portions with an electrically resistive portion that is proximate to such portions, and further comprising inherently allowing less heat to be applied from a part of the electrically resistive portion that is proximate a portion of the formation with a lower thermal conductivity while also allowing more heat to be applied from a part of the electrically resistive portion that is proximate a portion of the formation with a higher thermal conductivity.

959. The method of claim 935, wherein the subsurface formation contains at least two layers with different thermal conductivities, and further comprising applying heat to such layers with an electrically resistive portion that is proximate to such layers, and further comprising inherently allowing less heat to be applied from a part of an electrically resistive portion that is proximate a layer of the formation with a lower thermal conductivity.

960. The method of claim 935, wherein the subsurface formation contains at least two layers with different thermal conductivities, and further comprising applying heat to such layers with an electrically resistive portion that is proximate to such layers, and further comprising inherently allowing less heat to be applied from a part of the electrically resistive portion that is proximate a layer of the formation with a lower thermal conductivity while also allowing more heat to be applied from a part of the electrically resistive portion that is proximate a layer of the formation with a higher thermal conductivity.

961. The method of claim 935, further comprising controlling the heat applied from an electrically resistive portion by allowing less heat to be applied from any part of the electrically resistive portion that is at or near the selected temperature.

962. The method of claim 935, wherein an amount of heat output provided from at least one electrically resistive portion is determined by the amount of current applied to the electrical conductors.

963. The method of claim 935, further comprising controlling the amount of current applied to the electrical conductors to control an amount of heat provided by at least one electrically resistive portion.

964. The method of claim 935, further comprising increasing the amount of current applied to the electrical conductors to decrease an amount of heat provided by at least one electrically resistive portion.

965. The method of claim 935, further comprising decreasing the amount of current applied to the electrical conductors to increase an amount of heat provided by at least one electrically resistive portion.

966. The method of claim 935, further comprising applying at least about 70 amps of current to electrical conductors.

967. The method of claim 935, further comprising applying at least about 100 amps of current to electrical conductors.

968. The method of claim 935, further comprising producing fluids from the formation, and producing refined products from the produced fluids.

969. The method of claim 935, further comprising producing fluids from the formation, and producing a blending agent from the produced fluids.

970. The method of claim 935, further comprising producing fluids from the formation, and blending the produced fluids with hydrocarbons having an API gravity below about 15°.

971. A system configured to heat at least a part of a subsurface formation, comprising:

one or more electrical conductors configured to be placed in an opening in the formation, wherein at least one electrical conductor comprises at least one electrically resistive portion configured to provide a heat output when an alternating current is applied through such electrically resistive portion, and wherein at least one of such electrically resistive portions is configured, when operating above or near a selected temperature and when alternating current is applied, to only increase in operating temperature by less than about 1.5 °C when the thermal load decreases by about 1 watt per meter proximate to the one or more electrically resistive portions; and

wherein the system is configured to allow heat to transfer from at least one of the electrically resistive portions to at least a part of the formation.

972. The system of claim 971, wherein the subsurface formation comprises a hydrocarbon containing formation.

973. The system of claim 971, wherein the subsurface formation comprises a hydrocarbon containing formation, and wherein the system is configured to pyrolyze at least some hydrocarbons in the formation.

974. The system of claim 971, wherein the subsurface formation comprises contaminated soil.

975. The system of claim 971, wherein the subsurface formation comprises contaminated soil, and wherein the system is configured to remediate at least a portion of the contaminated soil.

976. The system of claim 971, wherein the system is configured to provide heat to at least a portion of the opening in the formation.

977. The system of claim 971, wherein three or more electrical conductors are configured to be coupled in a three-phase electrical configuration.

978. The system of claim 971, further comprising an electrically insulating material placed between at least two electrical conductors.

979. The system of claim 971, wherein at least one electrically resistive portion comprises a ferromagnetic material.

980. The system of claim 971, wherein at least one electrically resistive portion comprises a ferromagnetic material comprising iron, nickel, chromium, cobalt, tungsten, or mixtures thereof.

981. The system of claim 971, wherein at least one electrically resistive portion comprises a ferromagnetic material with a thickness that is at least about ¾ of a skin depth of the alternating current at the Curie temperature of the ferromagnetic material.

982. The system of claim 971, wherein at least one electrically resistive portion comprises a first ferromagnetic material with a first Curie temperature, and a second ferromagnetic material with a second Curie temperature.

983. The system of claim 971, wherein at least one electrically resistive portion comprises ferromagnetic material coupled to a higher conductivity non-ferromagnetic material.

984. The system of claim 971, wherein at least one electrically resistive portion comprises ferromagnetic material, and wherein the selected temperature is approximately the Curie temperature of the ferromagnetic material.

985. The system of claim 971, wherein the electrically resistive portion comprises a thickness of ferromagnetic material, and such ferromagnetic material is coupled to a thickness of a more conductive material, and wherein the thickness of the ferromagnetic material and the thickness of

the more conductive material have been selected such that the electrically resistive portion provides a selected resistance profile as a function of temperature.

986. The system of claim 971, wherein the heat output is greater than about 400 watts per meter below the selected temperature.

987. The system of claim 971, wherein at least one electrical conductor comprises at least one section configured to comprise a relatively flat AC resistance profile in a temperature range between about 100 °C and 750 °C.

988. The system of claim 971, wherein at least one electrical conductor is greater than about 10 m in length.

989. The system of claim 971, wherein the system is configured to sharply reduce the heat output at or near the selected temperature.

990. The system of claim 971, wherein the system is configured such that, at or near the selected temperature, the heat output of at least a portion of the system declines due to the Curie effect.

991. The system of claim 971, wherein the system comprises a heater which in turn comprises one or more of the electrically resistive portions.

992. The system of claim 971, configured such that when a temperature of at least one electrically resistive portion is below the selected temperature, and such temperature increases, then an AC resistance of such electrically resistive portion increases, and when a temperature of at least one electrically resistive portion is above the selected temperature, and such temperature increases, then an AC resistance of such electrically resistive portion decreases.

993. The system of claim 971, wherein the amount of heat output provided from at least one electrically resistive portion is configured to be determined by the amount of current applied to such electrically resistive portion below the selected temperature.

994. The system of claim 971, wherein the amount of current applied to at least one electrically resistive portion is at least about 70 amps.

995. The system of claim 971, wherein at least one electrically resistive portion comprises a turndown ratio of at least about 2 to 1.

996. The system of claim 971, wherein the applied current comprises alternating current operating at about 180 Hz AC frequency.

997. The system of claim 971, wherein the opening comprises an uncased wellbore.

998. The system of claim 971, wherein the system is configured to radiatively heat the formation in the opening.

999. The system of claim 971, wherein the system is configured to withstand operating temperatures of about 250 °C or above.

1000. The system of claim 971, wherein the system withstands operating temperatures of about 250 °C or above.

1001. The system of claim 971, wherein at least one electrically resistive portion is configured to inherently provide a decreased heat output above or near the selected temperature.

1002. The system of claim 971, wherein at least one electrically resistive portion is configured to inherently provide a heat output above or near the selected temperature that is about 20% or less of the heat output at about 50 °C below the selected temperature.

1003. A heater system, comprising:

an AC supply configured to provide alternating current at a voltage above about 650 volts;

an electrical conductor comprising at least one electrically resistive portion configured to provide a heat output during application of the alternating electrical current to the electrically resistive portion during use; and

wherein the electrical conductor comprises a ferromagnetic material and is configured to provide a reduced heat output above or near a selected temperature, wherein the selected temperature is at or about the Curie temperature of the ferromagnetic material.

1004. The heater system of claim 1003, wherein the voltage is above about 1000 volts.

1005. The heater system of claim 1003, wherein the heater is configured to provide heat to a subsurface formation.

1006. The heater system of claim 1003, wherein the heater is configured to provide heat to a hydrocarbon containing formation.

1007. The heater system of claim 1003, wherein the heater is configured to provide heat to a hydrocarbon containing formation, and wherein the system is configured to pyrolyze at least some hydrocarbons in the formation.

1008. The heater system of claim 1003, wherein the heater is configured to provide heat to contaminated soil.

1009. The heater system of claim 1003, wherein the heater is configured to provide heat to contaminated soil, and wherein the system is configured to remediate at least a portion of the contaminated soil.

1010. The heater system of claim 1003, wherein the system is configured to provide heat to at least a portion of an opening in a subsurface formation.

1011. The heater system of claim 1003, wherein three or more electrical conductors are configured to be coupled in a three-phase electrical configuration.

1012. The heater system of claim 1003, wherein the ferromagnetic material comprises iron, nickel, chromium, cobalt, tungsten, or mixtures thereof.

1013. The heater system of claim 1003, wherein the ferromagnetic material has a thickness that is at least about ¾ of a skin depth of the alternating current at the Curie temperature of the ferromagnetic material.

1014. The heater system of claim 1003, further comprising a higher conductivity non-ferromagnetic material coupled to the ferromagnetic material.

1015. The heater system of claim 1003, wherein the heat output is greater than about 400 watts per meter below the selected temperature.

1016. The heater system of claim 1003, wherein the electrical conductor comprises at least one section configured to comprise a relatively flat AC resistance profile in a temperature range between about 100 °C and 750 °C.

1017. The heater system of claim 1003, wherein the electrical conductor is greater than about 10 m in length.

1018. The heater system of claim 1003, wherein the system is configured to sharply reduce the heat output at or near the selected temperature.

1019. The heater system of claim 1003, wherein the system is configured such that, at or near the selected temperature, the heat output of at least a portion of the system declines due to the Curie effect.

1020. The heater system of claim 1003, configured such that when a temperature of the electrical conductor is below the selected temperature, and such temperature increases, then an AC resistance of the electrical conductor increases, and when a temperature of the electrical conductor is above the selected temperature, and such temperature increases, then an AC resistance of the electrical conductor decreases.

1021. The heater system of claim 1003, wherein the amount of current applied to the electrical conductor is at least about 70 amps.

1022. The heater system of claim 1003, wherein the electrical conductor comprises a turndown ratio of at least about 2 to 1.

1023. The heater system of claim 1003, wherein the alternating current comprises alternating current operating at about 180 Hz AC frequency.

1024. The heater system of claim 1003, wherein the system is configured to withstand operating temperatures of about 250 °C or above.

1025. The heater system of claim 1003, wherein the system withstands operating temperatures of about 250 °C or above.

1026. The heater system of claim 1003, wherein the electrical conductor is configured to inherently provide a decreased heat output above or near the selected temperature.

1027. The heater system of claim 1003, wherein the electrical conductor is configured to inherently provide a heat output above or near the selected temperature that is about 20% or less of the heat output at about 50 °C below the selected temperature.

1028. A method of heating, comprising:

providing an alternating current at a voltage above about 650 volts to an electrical conductor comprising at least one electrically resistive portion to provide a heat output; and

wherein at least one electrically resistive portion comprises a ferromagnetic material and is configured to provide a reduced heat output above or near a selected temperature, and wherein the selected temperature is at or about the Curie temperature of the ferromagnetic material.

1029. The method of heating of claim 1028, further comprising providing the alternating current to the electrical conductor when the electrical conductor is at or above the selected temperature.

1030. The method of heating of claim 1028, further comprising applying the alternating electrical current to the one or more electrical conductors at about 180 Hz operating frequency.

1031. The method of heating of claim 1028, further comprising allowing heat to transfer from at least one electrically resistive portion to at least a part of a subsurface formation.

1032. The method of heating of claim 1028, further comprising providing a relatively constant heat output in a temperature range between about 300 °C and 600 °C.

1033. The method of heating of claim 1028, further comprising providing a relatively constant heat output in a temperature range between about 100 °C and 750 °C.

1034. The method of heating of claim 1028, wherein at least one electrically resistive portion comprises an AC resistance that decreases above the selected temperature such that the electrically resistive portion provides the reduced heat output above the selected temperature.

1035. The method of heating of claim 1028, wherein at least one ferromagnetic material has a thickness of at least about ¾ of a skin depth of the alternating current at the Curie temperature of the ferromagnetic material.

1036. The method of heating of claim 1028, further comprising allowing heat to transfer from at least one electrically resistive portion to at least a part of a subsurface formation, wherein the subsurface formation comprises a hydrocarbon containing formation.

1037. The method of heating of claim 1028, further comprising allowing heat to transfer from at least one electrically resistive portion to at least a part of a hydrocarbon containing formation, and pyrolyzing at least some hydrocarbons in the formation.

1038. The method of heating of claim 1028, wherein the reduced heat output is less than about 400 watts per meter.

1039. The method of heating of claim 1028, further comprising controlling a skin depth in at least one electrically resistive portion by controlling a frequency of alternating current applied to at least one electrically resistive portion.

1040. The method of heating of claim 1028, further comprising applying additional power to at least one electrically resistive portion as the temperature of the electrically resistive portion increases, and continuing to do so until the temperature is at or near the selected temperature.

1041. The method of heating of claim 1028, further comprising controlling the heat applied from an electrically resistive portion by allowing less heat to be applied from any part of the electrically resistive portion that is at or near the selected temperature.

1042. The method of heating of claim 1028, wherein an amount of heat output provided from at least one electrically resistive portion is determined by the amount of current applied to the electrical conductors.

1043. The method of heating of claim 1028, further comprising controlling the amount of current applied to the electrical conductors to control an amount of heat provided by at least one electrically resistive portion.

1044. The method of heating of claim 1028, further comprising applying at least about 70 amps of current to the electrical conductors.

1045. The method of heating of claim 1028, further comprising applying at least about 100 amps of current to the electrical conductors.

1046. A system configured to heat at least a part of a subsurface formation, comprising:

one or more electrical conductors configured to be placed in an opening in the formation, wherein at least one electrical conductor comprises at least one electrically resistive portion that comprises at least one ferromagnetic material, and is configured to provide a heat output when an alternating current is provided to such electrically resistive portion, and wherein at least one of such electrically resistive portions is configured, when above or near a selected temperature, to inherently exhibit a decreased AC resistance; and

wherein the system is configured to allow heat to transfer from at least one of the electrically resistive portions to at least a part of the formation.

1047. The system of claim 1046, wherein the subsurface formation comprises a hydrocarbon containing formation.

1048. The system of claim 1046, wherein the subsurface formation comprises a hydrocarbon containing formation, and wherein the system is configured to pyrolyze at least some hydrocarbons in the formation.

1049. The system of claim 1046, wherein the subsurface formation comprises contaminated soil.

1050. The system of claim 1046, wherein the subsurface formation comprises contaminated soil, and wherein the system is configured to remediate at least a portion of the contaminated soil.

1051. The system of claim 1046, wherein the system is configured to provide heat to at least a portion of the opening in the formation.

1052. The system of claim 1046, wherein the decreased AC resistance is less than about 80% of the AC resistance at about 50 °C below the selected temperature.

1053. The system of claim 1046, wherein three or more electrical conductors are configured to be coupled in a three-phase electrical configuration.

1054. The system of claim 1046, further comprising an electrically insulating material placed between at least two electrical conductors.

1055. The system of claim 1046, wherein at least one ferromagnetic material comprises iron, nickel, chromium, cobalt, tungsten, or mixtures thereof.

1056. The system of claim 1046, wherein at least one ferromagnetic material has a thickness that is at least about ¾ of a skin depth of the alternating current at the Curie temperature of the ferromagnetic material.

1057. The system of claim 1046, wherein at least one electrically resistive portion comprises ferromagnetic material coupled to a higher conductivity non-ferromagnetic material.

1058. The system of claim 1046, wherein the selected temperature is approximately the Curie temperature of at least one ferromagnetic material.

1059. The system of claim 1046, wherein the electrically resistive portion comprises a thickness of ferromagnetic material, and such ferromagnetic material is coupled to a thickness of a more conductive material, and wherein the thickness of the ferromagnetic material and the thickness of the more conductive material have been selected such that the electrically resistive portion provides a selected resistance profile as a function of temperature.

1060. The system of claim 1046, wherein the heat output is greater than about 400 watts per meter below the selected temperature.

1061. The system of claim 1046, wherein at least one electrical conductor comprises at least one section configured to comprise a relatively flat AC resistance profile in a temperature range between about 100 °C and 750 °C.

1062. The system of claim 1046, wherein at least one electrical conductor is greater than about 10 m in length.

1063. The system of claim 1046, wherein the system is configured to sharply reduce the heat output at or near the selected temperature.

1064. The system of claim 1046, wherein the system is configured such that, at or near the selected temperature, the heat output of at least a portion of the system declines due to the Curie effect.

1065. The system of claim 1046, wherein the amount of heat output provided from at least one electrically resistive portion is configured to be determined by the amount of current applied to such electrically resistive portion below the selected temperature.

1066. The system of claim 1046, wherein the amount of current applied to at least one electrically resistive portion is at least about 70 amps.

1067. The system of claim 1046, wherein at least one electrically resistive portion comprises a turndown ratio of at least about 2 to 1.

1068. The system of claim 1046, wherein the applied current comprises alternating current operating at about 180 Hz AC frequency.

1069. The system of claim 1046, wherein the opening comprises an uncased wellbore.

1070. The system of claim 1046, wherein the system is configured to radiatively heat the formation in the opening.

1071. The system of claim 1046, wherein the system is configured to withstand operating temperatures of about 250 °C or above.

1072. The system of claim 1046, wherein at least one electrically resistive portion is configured to inherently provide a decreased heat output above or near the selected temperature.

1073. The system of claim 1046, wherein at least one electrically resistive portion is configured to inherently provide a heat output above or near the selected temperature that is about 20% or less of the heat output at about 50 °C below the selected temperature.

1074. A subsurface heating system, comprising:

one or more electrical conductors configured to be placed in an opening in the subsurface, wherein at least one electrical conductor comprises at least one electrically resistive portion configured to provide a heat output when an alternating current is applied through such electrically resistive portion, and wherein at least one of such electrically resistive portions is configured, when above or near a selected temperature, to provide a reduced heat output that is about 20% or less of the heat output provided at about 50 °C below the selected temperature; and

wherein the system is configured to allow heat to transfer from at least one of the electrically resistive portions to at least a part of the subsurface.

1075. The system of claim 1074, wherein the subsurface comprises a hydrocarbon containing formation.

1076. The system of claim 1074, wherein the subsurface comprises a hydrocarbon containing formation, and wherein the system is configured to pyrolyze at least some hydrocarbons in the formation.

1077. The system of claim 1074, wherein the subsurface comprises contaminated soil.

1078. The system of claim 1074, wherein the subsurface comprises contaminated soil, and wherein the system is configured to remediate at least a portion of the contaminated soil.

1079. The system of claim 1074, wherein the system is configured to provide heat to at least a portion of the opening in the subsurface.

1080. The system of claim 1074, wherein the reduced heat output is less than about 20% of the heat output at about 40 °C below the selected temperature.

1081. The system of claim 1074, wherein the reduced heat output is less than about 20% of the heat output at about 30 °C below the selected temperature.

1082. The system of claim 1074, wherein the reduced heat output is less than about 15% of the heat output at about 50 °C below the selected temperature.

1083. The system of claim 1074, wherein the reduced heat output is less than about 10% of the heat output at about 50 °C below the selected temperature.

1084. The system of claim 1074, wherein three or more electrical conductors are configured to be coupled in a three-phase electrical configuration.

1085. The system of claim 1074, wherein at least one electrically resistive portion has an AC resistance that decreases at, near, or above the selected temperature such that the heat output provided by at least one electrically resistive portion decreases above or near the selected temperature.

1086. The system of claim 1074, wherein at least one electrically resistive portion comprises a ferromagnetic material.

1087. The system of claim 1074, wherein at least one electrically resistive portion comprises a ferromagnetic material comprising iron, nickel, chromium, cobalt, tungsten, or mixtures thereof.

1088. The system of claim 1074, wherein at least one electrically resistive portion comprises a ferromagnetic material with a thickness that is at least about ¾ of a skin depth of the alternating current at the Curie temperature of the ferromagnetic material.

1089. The system of claim 1074, wherein at least one electrically resistive portion comprises a first ferromagnetic material with a first Curie temperature, and a second ferromagnetic material with a second Curie temperature.

1090. The system of claim 1074, wherein at least one electrically resistive portion comprises ferromagnetic material coupled to a higher conductivity non-ferromagnetic material.

1091. The system of claim 1074, wherein at least one electrically resistive portion comprises ferromagnetic material, and wherein the selected temperature is approximately the Curie temperature of the ferromagnetic material.

1092. The system of claim 1074, wherein the electrically resistive portion comprises a thickness of ferromagnetic material, and such ferromagnetic material is coupled to a thickness of a more conductive material, and wherein the thickness of the ferromagnetic material and the thickness of the more conductive material have been selected such that the electrically resistive portion provides a selected resistance profile as a function of temperature.

1093. The system of claim 1074, wherein the heat output is greater than about 400 watts per meter below the selected temperature.

1094. The system of claim 1074, wherein at least one electrical conductor comprises at least one section configured to comprise a relatively flat AC resistance profile in a temperature range between about 100 °C and 750 °C.

1095. The system of claim 1074, wherein at least one electrical conductor is greater than about 10 m in length.

1096. The system of claim 1074, wherein the system is configured to sharply reduce the heat output at or near the selected temperature.

1097. The system of claim 1074, wherein the system is configured such that, at or near the selected temperature, the heat output of at least a portion of the system declines due to the Curie effect.

1098. The system of claim 1074, configured such that when a temperature of at least one electrically resistive portion is below the selected temperature, and such temperature increases, then an AC resistance of such electrically resistive portion increases, and when a temperature of at least one electrically resistive portion is above the selected temperature, and such temperature increases, then an AC resistance of such electrically resistive portion decreases.

1099. The system of claim 1074, wherein the amount of heat output provided from at least one electrically resistive portion is configured to be determined by the amount of current applied to such electrically resistive portion below the selected temperature.

1100. The system of claim 1074, wherein the amount of current applied to at least one electrically resistive portion is at least about 70 amps.

1101. The system of claim 1074, wherein at least one electrically resistive portion comprises a turndown ratio of at least about 2 to 1.

1102. The system of claim 1074, wherein the applied current comprises alternating current operating at about 180 Hz AC frequency.

1103. The system of claim 1074, wherein the opening comprises an uncased wellbore.

1104. The system of claim 1074, wherein the system is configured to withstand operating temperatures of about 250 °C or above.

1105. The system of claim 1074, wherein at least one electrically resistive portion comprises a decreased AC resistance above or near the selected temperature that is less than about 80% of an AC resistance at about 50 °C below the selected temperature.

1106. A wellbore heating system, comprising:

one or more electrical conductors configured to be placed in the wellbore in the formation, wherein at least one electrical conductor comprises at least one electrically resistive portion configured to provide a heat output when alternating current is applied through such electrically resistive portion, and wherein at least one of such electrically resistive portions is configured such that the electric resistance though the electrically resistive portion decreases by at least about 20% when above or near a selected temperature, as compared to the electrical resistance at about 50 °C below the selected temperature; and

wherein the system is configured to allow heat to transfer from at least one of the electrically resistive portions to at least a part of the wellbore.

1107. The system of claim 1106, wherein the decreased electrical resistance provides a decreased heat output when above or near the selected temperature.

1108. The system of claim 1106, wherein the electric resistance though the electrically resistive portion decreases by at least about 30% when above or near a selected temperature, as compared to the electrical resistance at about 50 °C below the selected temperature.

1109. The system of claim 1106, wherein the electric resistance though the electrically resistive portion decreases by at least about 40% when above or near a selected temperature, as compared to the electrical resistance at about 50 °C below the selected temperature.

1110. The system of claim 1106, wherein the electric resistance through the electrically resistive portion decreases by at least about 50% when above or near a selected temperature, as compared to the electrical resistance at about 50 °C below the selected temperature.

1111. The system of claim 1106, wherein the wellbore is located in a subsurface formation.

1112. The system of claim 1106, wherein the wellbore is located in a hydrocarbon containing formation, and wherein the system is configured to pyrolyze at least some hydrocarbons in the formation.

1113. The system of claim 1106, wherein the wellbore is located in contaminated soil.

1114. The system of claim 1106, wherein the wellbore is located in contaminated soil, and wherein the system is configured to remediate at least a portion of the contaminated soil.

1115. The system of claim 1106, wherein three or more electrical conductors are configured to be coupled in a three-phase electrical configuration.

1116. The system of claim 1106, further comprising an electrically insulating material placed between at least two electrical conductors.

1117. The system of claim 1106, wherein at least one electrically resistive portion comprises a ferromagnetic material.

1118. The system of claim 1106, wherein at least one electrically resistive portion comprises a ferromagnetic material comprising iron, nickel, chromium, cobalt, tungsten, or mixtures thereof.

1119. The system of claim 1106, wherein at least one electrically resistive portion comprises a ferromagnetic material with a thickness that is at least about ¾ of a skin depth of the alternating current at the Curie temperature of the ferromagnetic material.

1120. The system of claim 1106, wherein at least one electrically resistive portion comprises a first ferromagnetic material with a first Curie temperature, and a second ferromagnetic material with a second Curie temperature.

1121. The system of claim 1106, wherein at least one electrically resistive portion comprises ferromagnetic material coupled to a higher conductivity non-ferromagnetic material.

1122. The system of claim 1106, wherein at least one electrically resistive portion comprises ferromagnetic material, and wherein the selected temperature is approximately the Curie temperature of the ferromagnetic material.

1123. The system of claim 1106, wherein the electrically resistive portion comprises a thickness of ferromagnetic material, and such ferromagnetic material is coupled to a thickness of a more conductive material, and wherein the thickness of the ferromagnetic material and the thickness of the more conductive material have been selected such that the electrically resistive portion provides a selected resistance profile as a function of temperature.

1124. The system of claim 1106, wherein the heat output is greater than about 400 watts per meter below the selected temperature.

1125. The system of claim 1106, wherein at least one electrical conductor comprises at least one section configured to comprise a relatively flat AC resistance profile in a temperature range between about 100 °C and 750 °C.

1126. The system of claim 1106, wherein at least one electrical conductor is greater than about 10 m in length.

1127. The system of claim 1106, wherein the system is configured to sharply reduce the heat output at or near the selected temperature.

1128. The system of claim 1106, wherein the system is configured such that, at or near the selected temperature, the heat output of at least a portion of the system declines due to the Curie effect.

1129. The system of claim 1106, wherein the amount of heat output provided from at least one electrically resistive portion is configured to be determined by the amount of current applied to such electrically resistive portion below the selected temperature.

1130. The system of claim 1106, wherein the amount of current applied to at least one electrically resistive portion is at least about 70 amps.

1131. The system of claim 1106, wherein at least one electrically resistive portion comprises a turndown ratio of at least about 2 to 1.

1132. The system of claim 1106, wherein the applied current comprises alternating current operating at about 180 Hz AC frequency.

1133. The system of claim 1106, wherein the wellbore comprises an uncased wellbore.

1134. The system of claim 1106, wherein the system is configured to withstand operating temperatures of about 250 °C or above.

1135. The system of claim 1106, wherein at least one electrically resistive portion is configured to provide a reduced heat output above or near the selected temperature that is less than about 20% of the heat output provided at about 50 °C below the selected temperature.

1136. A wellbore heating system, comprising:

one or more electrical conductors configured to be placed in the wellbore in the formation, wherein at least one electrical conductor comprises at least one electrically resistive portion configured to provide a heat output when alternating current is applied through such electrically resistive portion, and wherein at least one of such electrically resistive portions has, when above or near a selected temperature, a decreased AC resistance that is about 80% or less of an AC resistance at about 50 °C below the selected temperature; and

wherein the system is configured to allow heat to transfer from at least one of the electrically resistive portions to at least a part of the wellbore.

1137. The system of claim 1136, wherein the wellbore is located in a subsurface formation.

1138. The system of claim 1136, wherein the wellbore is located in a hydrocarbon containing formation, and wherein the system is configured to pyrolyze at least some hydrocarbons in the formation.

1139. The system of claim 1136, wherein the wellbore is located in contaminated soil.

1140. The system of claim 1136, wherein the wellbore is located in contaminated soil, and wherein the system is configured to remediate at least a portion of the contaminated soil.

1141. The system of claim 1136, wherein the decreased AC resistance is about 70% or less of the AC resistance at about 50 °C below the selected temperature.

1142. The system of claim 1136, wherein the decreased AC resistance is about 60% or less of the AC resistance at about 50 °C below the selected temperature.

1143. The system of claim 1136, wherein the decreased AC resistance is about 50% or less of the AC resistance at about 50 °C below the selected temperature.

1144. The system of claim 1136, wherein the decreased AC resistance is about 80% or less of the AC resistance at about 40 °C below the selected temperature.

1145. The system of claim 1136, wherein the decreased AC resistance is about 80% or less of the AC resistance at about 30 °C below the selected temperature.

1146. The system of claim 1136, wherein three or more electrical conductors are configured to be coupled in a three-phase electrical configuration.

1147. The system of claim 1136, further comprising an electrically insulating material placed between at least two electrical conductors.

1148. The system of claim 1136, wherein at least one electrically resistive portion comprises a ferromagnetic material.

1149. The system of claim 1136, wherein at least one electrically resistive portion comprises a ferromagnetic material comprising iron, nickel, chromium, cobalt, tungsten, or mixtures thereof.

1150. The system of claim 1136, wherein at least one electrically resistive portion comprises a ferromagnetic material with a thickness that is at least about ¾ of a skin depth of the alternating current at the Curie temperature of the ferromagnetic material.

1151. The system of claim 1136, wherein at least one electrically resistive portion comprises a first ferromagnetic material with a first Curie temperature, and a second ferromagnetic material with a second Curie temperature.

1152. The system of claim 1136, wherein at least one electrically resistive portion comprises ferromagnetic material coupled to a higher conductivity non-ferromagnetic material.

1153. The system of claim 1136, wherein at least one electrically resistive portion comprises ferromagnetic material, and wherein the selected temperature is approximately the Curie temperature of the ferromagnetic material.

1154. The system of claim 1136, wherein the electrically resistive portion comprises a thickness of ferromagnetic material, and such ferromagnetic material is coupled to a thickness of a more conductive material, and wherein the thickness of the ferromagnetic material and the thickness of the more conductive material have been selected such that the electrically resistive portion provides a selected resistance profile as a function of temperature.

1155. The system of claim 1136, wherein the heat output is greater than about 400 watts per meter below the selected temperature.

1156. The system of claim 1136, wherein at least one electrical conductor comprises at least one section configured to comprise a relatively flat AC resistance profile in a temperature range between about 100 °C and 750 °C.

1157. The system of claim 1136, wherein at least one electrical conductor is greater than about 10 m in length.

1158. The system of claim 1136, wherein the system is configured to sharply reduce the heat output at or near the selected temperature.

1159. The system of claim 1136, wherein the system is configured such that, at or near the selected temperature, the heat output of at least a portion of the system declines due to the Curie effect.

1160. The system of claim 1136, wherein the amount of heat output provided from at least one electrically resistive portion is configured to be determined by the amount of current applied to such electrically resistive portion below the selected temperature.

1161. The system of claim 1136, wherein the amount of current applied to at least one electrically resistive portion is at least about 70 amps.

1162. The system of claim 1136, wherein at least one electrically resistive portion comprises a turndown ratio of at least about 2 to 1.

1163. The system of claim 1136, wherein the applied current comprises alternating current operating at about 180 Hz AC frequency.

1164. The system of claim 1136, wherein the wellbore comprises an uncased wellbore.

1165. The system of claim 1136, wherein the system is configured to withstand operating temperatures of about 250 °C or above.

1166. The system of claim 1136, wherein at least one electrically resistive portion is configured to provide a reduced heat output above or near the selected temperature that is less than about 20% of the heat output provided at about 50 °C below the selected temperature.

1167. A method for heating a subsurface formation, comprising:

applying an alternating electrical current to one or more electrical conductors placed in an opening in the formation, wherein at least one electrical conductor comprises one or more electrically resistive portions, and wherein at least one electrically resistive portion comprises one or more ferromagnetic materials;

providing a heat output from at least one electrically resistive portion, wherein at least one of such electrically resistive portions is configured, when above or near a selected temperature, to inherently exhibit a decreased AC resistance; and

allowing the heat to transfer from one or more electrically resistive portions to at least a part of the formation.

1168. The method of claim 1167, further comprising applying the alternating electrical current to the one or more electrical conductors at about 180 Hz operating frequency.

1169. The method of claim 1167, wherein the heat is allowed to transfer radiatively from the one or more electrically resistive portions to at least a part of the formation.

1170. The method of claim 1167, wherein the selected temperature is approximately the Curie temperature of at least one ferromagnetic material.

1171. The method of claim 1167, further comprising providing a relatively constant heat output in a temperature range between about 100 °C and 750 °C.

1172. The method of claim 1167, wherein at least one electrically resistive portion comprises an AC resistance that decreases above the selected temperature such that the electrically resistive portion provides the reduced heat output above the selected temperature.

1173. The method of claim 1167, wherein the subsurface formation comprises a hydrocarbon containing formation.

1174. The method of claim 1167, wherein the subsurface formation comprises a hydrocarbon containing formation, the method further comprising pyrolyzing at least some hydrocarbons in the formation.

1175. The method of claim 1167, wherein the subsurface formation comprises a hydrocarbon containing formation, the method further comprising locating at least one electrically resistive portion proximate a relatively rich zone of the formation.

1176. The method of claim 1167, wherein the reduced heat output is less than about 400 watts per meter.

1177. The method of claim 1167, further comprising applying at least about 70 amps of current to the electrical conductors.

1178. The method of claim 1167, further comprising producing fluids from the formation, and producing refined products from the produced fluids.

1179. The method of claim 1167, further comprising producing fluids from the formation, and producing a blending agent from the produced fluids.

1180. The method of claim 1167, further comprising producing fluids from the formation, and blending the produced fluids with hydrocarbons having an API gravity below about 15°.

1181. A method for heating a subsurface formation, comprising:

applying an alternating electrical current to one or more electrical conductors placed in an opening in the formation, wherein at least one electrical conductor comprises one or more electrically resistive portions;

providing a heat output from at least one electrically resistive portion, wherein at least one of such electrically resistive portions is configured, when above or near a selected temperature, to provide a heat output that is about 20% or less of the heat output at about 50 °C below the selected temperature; and

allowing the heat to transfer from one or more electrically resistive portions to at least a part of the formation.

1182. The method of claim 1181, further comprising applying the alternating electrical current to the one or more electrical conductors at about 180 Hz operating frequency.

1183. The method of claim 1181, wherein the reduced heat output is less than about 20% of the heat output at about 40 °C below the selected temperature.

1184. The method of claim 1181, wherein the reduced heat output is less than about 20% of the heat output at about 30 °C below the selected temperature.

1185. The method of claim 1181, wherein the reduced heat output is less than about 15% of the heat output at about 50 °C below the selected temperature.

1186. The method of claim 1181, wherein the reduced heat output is less than about 10% of the heat output at about 50 °C below the selected temperature.

1187. The method of claim 1181, wherein the heat is allowed to transfer radiatively from the one or more electrically resistive portions to at least a part of the formation.

1188. The method of claim 1181, wherein the selected temperature is approximately the Curie temperature of at least one ferromagnetic material.

1189. The method of claim 1181, further comprising providing a relatively constant heat output in a temperature range between about 100 °C and 750 °C.

1190. The method of claim 1181, wherein at least one electrically resistive portion comprises an AC resistance that decreases above the selected temperature such that the electrically resistive portion provides the reduced heat output above the selected temperature.

1191. The method of claim 1181, wherein the subsurface formation comprises a hydrocarbon containing formation.

1192. The method of claim 1181, wherein the subsurface formation comprises a hydrocarbon containing formation, the method further comprising pyrolyzing at least some hydrocarbons in the formation.

1193. The method of claim 1181, wherein the subsurface formation comprises a hydrocarbon containing formation, the method further comprising locating at least one electrically resistive portion proximate a relatively rich zone of the formation.

1194. The method of claim 1181, wherein the reduced heat output is less than about 400 watts per meter.

1195. The method of claim 1181, further comprising applying at least about 70 amps of current to the electrical conductors.

1196. A method for heating a subsurface formation, comprising:

applying an alternating electrical current to one or more electrical conductors placed in an opening in the formation, wherein at least one electrical conductor comprises one or more electrically resistive portions;

providing a heat output from at least one electrically resistive portion, wherein at least one of such electrically resistive portions, when above or near a selected temperature, has a

decreased AC resistance that is about 80% or less of the AC resistance at about 50 °C below the selected temperature; and

allowing the heat to transfer from one or more electrically resistive portions to at least a part of the formation.

1197. The method of claim 1196, further comprising applying the alternating electrical current to the one or more electrical conductors at about 180 Hz operating frequency.

1198. The method of claim 1196, wherein the decreased AC resistance is about 70% or less of the AC resistance at about 50 °C below the selected temperature.

1199. The method of claim 1196, wherein the decreased AC resistance is about 60% or less of the AC resistance at about 50 °C below the selected temperature.

1200. The method of claim 1196, wherein the decreased AC resistance is about 50% or less of the AC resistance at about 50 °C below the selected temperature.

1201. The method of claim 1196, wherein the decreased AC resistance is about 80% or less of the AC resistance at about 40 °C below the selected temperature.

1202. The method of claim 1196, wherein the decreased AC resistance is about 80% or less of the AC resistance at about 30 °C below the selected temperature.

1203. The method of claim 1196, wherein the heat is allowed to transfer radiatively from the one or more electrically resistive portions to at least a part of the formation.

1204. The method of claim 1196, wherein the selected temperature is approximately the Curie temperature of at least one ferromagnetic material.

1205. The method of claim 1196, further comprising providing a relatively constant heat output in a temperature range between about 100 °C and 750 °C.

1206. The method of claim 1196, wherein at least one electrically resistive portion comprises an AC resistance that decreases above the selected temperature such that the electrically resistive portion provides the reduced heat output above the selected temperature.

1207. The method of claim 1196, wherein the subsurface formation comprises a hydrocarbon containing formation.

1208. The method of claim 1196, wherein the subsurface formation comprises a hydrocarbon containing formation, the method further comprising pyrolyzing at least some hydrocarbons in the formation.

1209. The method of claim 1196, wherein the subsurface formation comprises a hydrocarbon containing formation, the method further comprising locating at least one electrically resistive portion proximate a relatively rich zone of the formation.

1210. The method of claim 1196, wherein the reduced heat output is less than about 400 watts per meter.

1211. The method of claim 1196, further comprising applying at least about 70 amps of current to electrical conductors.

1212. A system configured to heat at least a part of a subsurface formation, comprising:

one or more electrical conductors configured to be placed in an opening in the formation, wherein at least one electrical conductor comprises an electrically resistive ferromagnetic material configured to provide, when energized by an alternating current, a reduced heat output above or near a selected temperature; and

wherein the system is configured to allow heat to transfer from the electrical conductors to a part of the formation.

1213. The system of claim 1212, wherein the subsurface formation comprises a hydrocarbon containing formation.

1214. The system of claim 1212, wherein the subsurface formation comprises a hydrocarbon containing formation, and wherein the system is configured to pyrolyze at least some hydrocarbons in the formation.

1215. The system of claim 1212, wherein the subsurface formation comprises contaminated soil.

1216. The system of claim 1212, wherein the subsurface formation comprises contaminated soil, and wherein the system is configured to remediate at least a portion of the contaminated soil.

1217. The system of claim 1212, wherein the system is configured to provide heat to at least a portion of the opening in the formation.

1218. The system of claim 1212, wherein three or more electrical conductors are configured to be coupled in a three-phase electrical configuration.

1219. The system of claim 1212, wherein at least one electrical conductor comprises an inner conductor and at least one electrical conductor comprises an outer conductor.

1220. The system of claim 1212, further comprising an electrically insulating material placed between at least two electrical conductors.

1221. The system of claim 1212, wherein the ferromagnetic material comprises an AC resistance that decreases above the selected temperature such that the system provides the reduced heat output above the selected temperature.

1222. The system of claim 1212, further comprising a higher conductivity non-ferromagnetic material coupled to the ferromagnetic material.

1223. The system of claim 1212, further comprising a second ferromagnetic material coupled to the ferromagnetic material.

1224. The system of claim 1212, wherein the selected temperature is approximately the Curie temperature of the ferromagnetic material.

1225. The system of claim 1212, wherein at least one electrical conductor is electrically coupled to the earth, and wherein electrical current is propagated from the electrical conductor to the earth.

1226. The system of claim 1212, wherein the reduced heat output is less than about 400 watts per meter.

1227. The system of claim 1212, wherein the heat output is greater than about 400 watts per meter below the selected temperature.

1228. The system of claim 1212, wherein at least one electrical conductor comprises at least one section configured to comprise a relatively flat AC resistance profile in a temperature range between about 100 °C and 750 °C.

1229. The system of claim 1212, wherein at least one electrical conductor is greater than about 10 m in length.

1230. The system of claim 1212, wherein the amount of current applied to the ferromagnetic material is at least about 70 amps.

1231. The system of claim 1212, wherein the ferromagnetic material comprises a turndown ratio of at least about 2 to 1.

1232. A method for heating a subsurface formation, comprising:

applying an alternating electrical current to one or more electrical conductors placed in an opening in the formation, wherein at least one electrical conductor comprises a ferromagnetic material;

providing a heat output, wherein the ferromagnetic material is configured to provide a reduced heat output above or near a selected temperature; and

allowing the heat to transfer from the one or more electrical conductors to a part of the formation.

1233. The method of claim 1232, further comprising providing a relatively constant heat output in a temperature range between about 100 °C and 750 °C.

1234. The method of claim 1232, wherein the ferromagnetic material comprises an AC resistance that decreases above the selected temperature such that the ferromagnetic material provides the reduced heat output above the selected temperature.

1235. The method of claim 1232, wherein the ferromagnetic material comprises a thickness greater than about ¾ of a skin depth of the alternating current at the Curie temperature of the ferromagnetic material.

1236. The method of claim 1232, wherein the selected temperature is approximately the Curie temperature of the ferromagnetic material.

1237. The method of claim 1232, wherein the subsurface formation comprises a hydrocarbon containing formation.

1238. The method of claim 1232, wherein the subsurface formation comprises a hydrocarbon containing formation, the method further comprising pyrolyzing at least some hydrocarbons in the formation.

1239. The method of claim 1232, wherein the reduced heat output is less than about 400 watts per meter.

1240. The method of claim 1232, wherein the heat output is greater than about 400 watts per meter below the selected temperature.

1241. The method of claim 1232, further comprising controlling the amount of current applied to the ferromagnetic material to control the amount of heat provided by the ferromagnetic material.

1242. The method of claim 1232, further comprising applying at least about 70 amps of current to the ferromagnetic material.

1243. A system configured to heat at least a part of a subsurface formation, comprising:

one or more electrical conductors configured to be placed in an opening in the formation, wherein at least one electrical conductor comprises a ferromagnetic material configured to provide a reduced heat output above or near a selected temperature, wherein at least one electrical conductor is electrically coupled to the earth, and wherein alternating electrical current propagates from the electrical conductor to the earth; and

wherein the system is configured to allow heat to transfer from the electrical conductors to a part of the formation.

1244. The system of claim 1243, wherein at least one electrical conductor is electrically coupled to the earth through an electrical contacting section.

1245. The system of claim 1243, wherein the electrical contacting section comprises a second opening coupled to the opening.

1246. The system of claim 1243, wherein the electrical contacting section comprises a second opening coupled to the opening and having a larger diameter than the opening.

1247. The system of claim 1243, wherein the electrical contacting section comprises a second opening coupled to the opening, and wherein the second opening is filled with a material that enhances electrical contact between at least one electrical conductor and the earth.

1248. The system of claim 1243, wherein at least one electrical conductor is configured to propagate electrical current into the opening.

1249. The system of claim 1243, wherein at least one electrical conductor is configured to propagate electrical current out of the opening.

1250. The system of claim 1243, wherein three or more electrical conductors are configured to be coupled in a three-phase electrical configuration.

1251. The system of claim 1243, wherein at least one electrical conductor comprises an inner conductor and at least one electrical conductor comprises an outer conductor.

1252. The system of claim 1243, further comprising an electrically insulating material placed between at least two electrical conductors.

1253. The system of claim 1243, wherein the ferromagnetic material comprises a resistance that decreases above the selected temperature such that the system provides the reduced heat output above the selected temperature.

1254. The system of claim 1243, wherein the ferromagnetic material comprises a thickness greater than about ¾ of a skin depth of the alternating current at the Curie temperature of the ferromagnetic material.

1255. The system of claim 1243, further comprising a higher conductivity material coupled to the ferromagnetic material.

1256. The system of claim 1243, further comprising a higher conductivity non-ferromagnetic material coupled to the ferromagnetic material.

1257. The system of claim 1243, further comprising a second ferromagnetic material coupled to the ferromagnetic material.

1258. The system of claim 1243, wherein the selected temperature is approximately the Curie temperature of the ferromagnetic material.

1259. The system of claim 1243, wherein the ferromagnetic material comprises iron.

1260. The system of claim 1243, wherein the reduced heat output is less than about 400 watts per meter.

1261. The system of claim 1243, wherein the heat output is greater than about 400 watts per meter below the selected temperature.

1262. The system of claim 1243, wherein at least one electrical conductor comprises at least one section configured to comprise a relatively flat AC resistance profile in a temperature range between about 100 °C and 750 °C.

1263. The system of claim 1243, wherein at least one electrical conductor is greater than about 10 m in length.

1264. The system of claim 1243, wherein the amount of current applied to the ferromagnetic material is at least about 70 amps.

1265. The system of claim 1243, wherein the ferromagnetic material comprises a turndown ratio of at least about 2 to 1.

1266. The system of claim 1243, wherein the subsurface formation comprises a hydrocarbon containing formation.

1267. The system of claim 1243, wherein the subsurface formation comprises a hydrocarbon containing formation, and wherein the system is configured to pyrolyze at least some hydrocarbons in the formation.

1268. The system of claim 1243, wherein the subsurface formation comprises contaminated soil.

1269. The system of claim 1243, wherein the subsurface formation comprises contaminated soil, and wherein the system is configured to remediate at least a portion of the contaminated soil.

1270. The system of claim 1243, wherein the system is configured to provide heat to at least a portion of the opening in the formation.

1271. A method for heating a subsurface formation, comprising:

applying an alternating electrical current to one or more electrical conductors placed in an opening in the formation, wherein at least one electrical conductor comprises a ferromagnetic material;

providing a heat output from the ferromagnetic material, wherein the ferromagnetic material is configured to provide a reduced heat output above or near a selected temperature, wherein at least one electrical conductor is electrically coupled to the earth, and wherein electrical current propagates from the electrical conductor to the earth; and

allowing the heat to transfer from the one or more electrical conductors to a part of the formation.

1272. The method of claim 1271, further comprising allowing the electrical current to propagate through at least one electrical conductor into the opening.

1273. The method of claim 1271, further comprising providing a relatively constant heat output in a temperature range between about 100 °C and 750 °C.

1274. The method of claim 1271, wherein the ferromagnetic material comprises a resistance that decreases above the selected temperature such that the ferromagnetic material provides the reduced heat output above the selected temperature.

1275. The method of claim 1271, wherein the ferromagnetic material comprises a thickness greater than about ¾ of a skin depth of the alternating current at the Curie temperature of the ferromagnetic material.

1276. The method of claim 1271, wherein the selected temperature is approximately the Curie temperature of the ferromagnetic material.

1277. The method of claim 1271, wherein the subsurface formation comprises a hydrocarbon containing formation.

1278. The method of claim 1271, wherein the subsurface formation comprises a hydrocarbon containing formation, the method further comprising pyrolyzing at least some hydrocarbons in the formation.

1279. The method of claim 1271, wherein the reduced heat output is less than about 400 watts per meter.

1280. The method of claim 1271, wherein the heat output is greater than about 400 watts per meter below the selected temperature.

1281. The method of claim 1271, wherein the amount of heat output provided from the ferromagnetic material is determined by the amount of current applied to the ferromagnetic material.

1282. The method of claim 1271, further comprising controlling the amount of current applied to the ferromagnetic material to control the amount of heat provided by the ferromagnetic material.

1283. The method of claim 1271, further comprising applying at least about 70 amps of current to the ferromagnetic material.

1284. A heater system, comprising:

an AC supply configured to provide alternating current at a frequency between about 100 Hz and about 600 Hz;

an electrical conductor comprising at least one electrically resistive portion configured to provide a heat output during application of the alternating electrical current to the electrically resistive portion during use; and

wherein the electrical conductor comprises a ferromagnetic material and is configured to provide a reduced heat output above or near a selected temperature, and wherein the selected temperature is at or about the Curie temperature of the ferromagnetic material.

1285. The heater system of claim 1284, wherein the AC supply is coupled to a supply of line current, and wherein the AC supply is configured to provide alternating current at about three times the frequency of the line current.

1286. The heater system of claim 1284, wherein the frequency is between about 140 Hz and about 200 Hz.

1287. The heater system of claim 1284, wherein the frequency is between about 400 Hz and about 550 Hz.

1288. The heater system of claim 1284, wherein the heater is configured to provide heat to a subsurface formation.

1289. The heater system of claim 1284, wherein the heater is configured to provide heat to a hydrocarbon containing formation, and wherein the system is configured to pyrolyze at least some hydrocarbons in the formation.

1290. The heater system of claim 1284, wherein the heater is configured to provide heat to contaminated soil, and wherein the system is configured to remediate at least a portion of the contaminated soil.

1291. The heater system of claim 1284, wherein the system is configured to provide heat to at least a portion of an opening in a subsurface formation.

1292. The heater system of claim 1284, wherein the ferromagnetic material comprises iron, nickel, chromium, cobalt, tungsten, or mixtures thereof.

1293. The heater system of claim 1284, wherein the ferromagnetic material has a thickness that is at least about ¾ of a skin depth of the alternating current at the Curie temperature of the ferromagnetic material.

1294. The heater system of claim 1284, wherein the ferromagnetic material is coupled to a higher conductivity non-ferromagnetic material.

1295. The heater system of claim 1284, wherein the heat output is greater than about 400 watts per meter below the selected temperature.

1296. The heater system of claim 1284, wherein at least one electrical conductor comprises at least one section configured to comprise a relatively flat AC resistance profile in a temperature range between about 100 °C and 750 °C.

1297. The heater system of claim 1284, wherein at least one electrical conductor is greater than about 10 m in length.

1298. The heater system of claim 1284, wherein the system is configured to sharply reduce the heat output at or near the selected temperature.

1299. The heater system of claim 1284, wherein the system is configured such that, at or near the selected temperature, the heat output of at least a portion of the system declines due to the Curie effect.

1300. The heater system of claim 1284, wherein the amount of heat output provided from at least one electrically resistive portion is configured to be determined by the amount of current applied to such electrically resistive portion below the selected temperature.

1301. The heater system of claim 1284, wherein the amount of current applied to at least one electrically resistive portion is at least about 70 amps.

1302. The heater system of claim 1284, wherein at least one electrically resistive portion comprises a turndown ratio of at least about 2 to 1.

1303. The heater system of claim 1284, wherein the heater system is configured to withstand operating temperatures of about 250 °C or above.

1304. The heater system of claim 1284, wherein the electrical conductor is configured to inherently provide a decreased heat output above or near the selected temperature.

1305. The heater system of claim 1284, wherein the electrical conductor is configured to inherently provide a heat output above or near the selected temperature that is about 20% or less of the heat output at about 50 °C below the selected temperature.

1306. A method of heating, comprising:

providing an alternating current at a frequency between about 100 Hz and about 600 Hz to an electrical conductor comprising at least one electrically resistive portion to provide a heat output; and

wherein the electrical conductor comprises a ferromagnetic material and is configured to provide a reduced heat output above or near a selected temperature, and wherein the selected temperature is at or about the Curie temperature of the ferromagnetic material.

1307. The method of heating of claim 1306, further comprising providing the alternating current to the electrical conductor when the electrical conductor is at or above the selected temperature.

1308. The method of heating of claim 1306, further comprising providing the alternating current at about three times the frequency of line current from an AC supply.

1309. The method of heating of claim 1306, wherein the frequency is between about 140 Hz and about 200 Hz.

1310. The method of heating of claim 1306, wherein the frequency is between about 400 Hz and about 550 Hz.

1311. The method of heating of claim 1306, further comprising providing the alternating current to the electrical conductor when the electrical conductor is at or above the selected temperature.

1312. The method of heating of claim 1306, further comprising allowing heat to transfer from at least one electrically resistive portion to at least a part of a subsurface formation.

1313. The method of heating of claim 1306, further comprising providing a relatively constant heat output in a temperature range between about 100 °C and 750 °C.

1314. The method of heating of claim 1306, wherein the electrical conductor comprises an AC resistance that decreases above the selected temperature such that the electrical conductor provides the reduced heat output above the selected temperature.

1315. The method of heating of claim 1306, wherein the ferromagnetic material has a thickness of at least about ¾ of a skin depth of the alternating current at the Curie temperature of the ferromagnetic material.

1316. The method of heating of claim 1306, further comprising allowing heat to transfer from the electrical conductor to at least a part of a subsurface formation, wherein the subsurface formation comprises a hydrocarbon containing formation.

1317. The method of heating of claim 1306, further comprising allowing heat to transfer from the electrical conductor to at least a part of a hydrocarbon containing formation, and pyrolyzing at least some hydrocarbons in the formation.

1318. The method of heating of claim 1306, wherein the reduced heat output is less than about 400 watts per meter.

1319. The method of heating of claim 1306, further comprising controlling a skin depth in the electrical conductor by controlling a frequency of alternating current applied to the electrical conductor.

1320. The method of heating of claim 1306, further comprising controlling the heat applied from the electrical conductor by allowing less heat to be applied from any part of the electrical conductor that is at or near the selected temperature.

1321. The method of heating of claim 1306, further comprising controlling the amount of current applied to the electrical conductor to control an amount of heat provided by at least one electrically resistive portion.

1322. The method of heating of claim 1306, further comprising applying at least about 70 amps of current to the electrical conductor.

1323. A heater, comprising:

an electrical conductor configured to generate heat during application of electrical current to the electrical conductor, wherein the electrical conductor is configured to provide a heat output of at least about 400 watts per meter during use below a selected temperature; and

wherein the electrical conductor comprises a ferromagnetic material that, when alternating current is applied to it, a skin depth of such alternating current is greater than about ¾ of the skin depth of the alternating current at the Curie temperature of the ferromagnetic material, such that the heater provides a reduced heat output above or near the selected temperature.

1324. The heater of claim 1323, wherein the heater is configured to provide heat to a subsurface formation.

1325. The heater of claim 1323, wherein the heater is configured to provide heat to a hydrocarbon containing formation, and wherein the system is configured to pyrolyze at least some hydrocarbons in the formation.

1326. The heater of claim 1323, wherein the heater is configured to provide heat to contaminated soil, and wherein the system is configured to remediate at least a portion of the contaminated soil.

1327. The heater of claim 1323, wherein the heater is configured to provide heat to at least a portion of an opening in a subsurface formation.

1328. The heater of claim 1323, further comprising two additional electrical conductors configured to generate heat during application of electrical current to the two additional electrical conductors, wherein the electrical conductor and the two additional electrical conductors are configured to be coupled in a three-phase electrical configuration.

1329. The heater of claim 1323, further comprising at least one additional electrical conductor.

1330. The heater of claim 1323, further comprising at least one additional electrical conductor and an electrically insulating material placed between the electrical conductor and at least one additional electrical conductor.

1331. The heater of claim 1323, wherein a resistance of the ferromagnetic material decreases above the selected temperature such that the heater provides the reduced heat output above the selected temperature.

1332. The heater of claim 1323, further comprising a higher conductivity material coupled to the ferromagnetic material.

1333. The heater of claim 1323, further comprising a higher conductivity non-ferromagnetic material coupled to the ferromagnetic material.

1334. The heater of claim 1323, further comprising a second ferromagnetic material coupled to the ferromagnetic material.

1335. The heater of claim 1323, wherein the selected temperature is approximately the Curie temperature of the ferromagnetic material.

1336. The heater of claim 1323, wherein the ferromagnetic material comprises iron.

1337. The heater of claim 1323, wherein the reduced heat output is less than about 400 watts per meter.

1338. The heater of claim 1323, wherein the heater comprises a relatively flat AC resistance profile in a temperature range between about 100 °C and 750 °C.

1339. The heater of claim 1323, wherein the heater is greater than about 10 m in length.

1340. The heater of claim 1323, wherein the amount of heat output provided from the ferromagnetic material is configured to be determined by an amount of current applied to the ferromagnetic material.

1341. The heater of claim 1323, wherein the amount of current applied to the ferromagnetic material is at least about 70 amps.

1342. The heater of claim 1323, wherein the ferromagnetic material comprises a turndown ratio of at least about 2 to 1.

1343. The heater of claim 1323, wherein the heater is configured to be used to provide heat in a chemical plant.

1344. The heater of claim 1323, wherein the heater is configured to be used to provide heat to a reactor tube.

1345. The heater of claim 1323, wherein the heater is configured to be used to provide heat to a distillation column.

1346. The heater of claim 1323, wherein the heater is configured to be used to provide heat to a coker.

1347. The heater of claim 1323, wherein the heater comprises a 100,000 hour creep strength of at least about 3,000 psi at 650 °C.

1348. The heater of claim 1323, wherein the heater comprises an outside diameter of less than about 5 cm.

1349. A method, comprising:

applying an alternating electrical current to one or more electrical conductors, wherein at least one electrical conductor comprises a ferromagnetic material; and

providing a heat output from the ferromagnetic material, wherein the ferromagnetic material is configured to provide a reduced heat output above or near a selected temperature, wherein the heat output is at least about 400 watts per meter below the selected temperature.

1350. The method of claim 1349, further comprising providing the alternating current to the electrical conductor when the electrical conductor is at or above the selected temperature.

1351. The method of claim 1349, further comprising applying the alternating electrical current to the one or more electrical conductors at about 180 Hz operating frequency.

1352. The method of claim 1349, further comprising allowing heat to transfer from at least one electrical conductor to at least a part of a subsurface formation.

1353. The method of claim 1349, further comprising providing a relatively constant heat output in a temperature range between about 300 °C and 600 °C.

1354. The method of claim 1349, further comprising providing a relatively constant heat output in a temperature range between about 100 °C and 750 °C.

1355. The method of claim 1349, wherein at least one electrical conductor comprises an AC resistance that decreases above the selected temperature such that the electrical conductor provides the reduced heat output above the selected temperature.

1356. The method of claim 1349, wherein the ferromagnetic material has a thickness of at least about ¾ of a skin depth of the alternating current at the Curie temperature of the ferromagnetic material.

1357. The method of claim 1349, further comprising allowing heat to transfer from at least one electrical conductor to at least a part of a subsurface formation, wherein the subsurface formation comprises a hydrocarbon containing formation.

1358. The method of claim 1349, further comprising allowing heat to transfer from at least one electrical conductor to at least a part of a hydrocarbon containing formation, and pyrolyzing at least some hydrocarbons in the formation.

1359. The method of claim 1349, wherein the reduced heat output is less than about 400 watts per meter.

1360. The method of claim 1349, further comprising controlling a skin depth in at least one electrical conductor by controlling a frequency of alternating current applied to at least one electrical conductor.

1361. The method of claim 1349, further comprising applying additional power to at least one electrical conductor as the temperature of the electrical conductor increases, and continuing to do so until the temperature is at or near the selected temperature.

1362. The method of claim 1349, further comprising controlling the heat applied from an electrical conductor by allowing less heat to be applied from any part of the electrical conductor that is at or near the selected temperature.

1363. The method of claim 1349, further comprising controlling the amount of current applied to the electrical conductors to control an amount of heat provided by at least one electrically resistive portion.

1364. The method of claim 1349, further comprising applying at least about 70 amps of current to the electrical conductors.

1365. A heater, comprising:
an electrical conductor;
an electrical insulator at least partially surrounding the electrical conductor;
a sheath at least partially surrounding the electrical insulator;

a conduit configured to generate a heat output during application of alternating electrical current to the conduit, wherein the electrical conductor, the electrical insulator, and the sheath are at least partially located inside the conduit; and

wherein the conduit comprises a ferromagnetic material such that the heater provides a reduced heat output above or near a selected temperature.

1366. The heater of claim 1365, wherein the amount of current applied to the conduit is at least about 70 amps.

1367. The heater of claim 1365, wherein the heat output below the selected temperature is configured to be increased by decreasing the amount of current applied to the conduit.

1368. The heater of claim 1365, wherein the heat output below the selected temperature is configured to be decreased by increasing the amount of current applied to the conduit.

1369. The heater of claim 1365, wherein the heater is configured to allow heat to transfer from the heater to a part of a subsurface formation to pyrolyze at least some hydrocarbons in the subsurface formation.

1370. The heater of claim 1365, wherein the heater is configured to be placed in an opening in a subsurface formation.

1371. The heater of claim 1365, wherein a resistance of the ferromagnetic material decreases above the selected temperature such that the heater provides the reduced heat output above the selected temperature.

1372. The heater of claim 1365, further comprising a second ferromagnetic material coupled to the ferromagnetic material.

1373. The heater of claim 1365, wherein the selected temperature is approximately the Curie temperature of the ferromagnetic material.

1374. The heater of claim 1365, wherein the ferromagnetic material comprises iron.

1375. The heater of claim 1365, wherein the reduced heat output is less than about 400 watts per meter.

1376. The heater of claim 1365, wherein the heat output is greater than about 400 watts per meter below the selected temperature.

1377. The heater of claim 1365, wherein the heater comprises a relatively flat AC resistance profile in a temperature range between about 100 °C and 750 °C.

1378. The heater of claim 1365, wherein the heater is greater than about 10 m in length.

1379. The heater of claim 1365, wherein the ferromagnetic material comprises a turndown ratio of at least about 2 to 1.

1380. The heater of claim 1365, wherein the heater comprises an outside diameter of less than about 5 cm.

1381. The heater of claim 1365, wherein the electrical conductor comprises copper.

1382. The heater of claim 1365, wherein the electrical conductor comprises stranded copper.

1383. The heater of claim 1365, wherein the electrical conductor comprises stranded copper coated with steel.

1384. The heater of claim 1365, wherein the electrical conductor, the electrical insulator, and the sheath are portions of a furnace cable.

1385. The heater of claim 1365, wherein the electrical conductor, the electrical insulator, and the sheath are portions of an insulated conductor heater.

1386. The heater of claim 1365, wherein a thickness of the conduit is at least about ¾ of a skin depth of alternating current at the Curie temperature of the ferromagnetic material.

1387. The heater of claim 1365, wherein the electrical insulator comprises magnesium oxide.

1388. The heater of claim 1365, wherein the sheath comprises steel.

1389. The heater of claim 1365, further comprising a low electrical resistance metal coupled to at least a portion of the outside of the ferromagnetic material.

1390. The heater of claim 1389, further comprising a protective sheath coupled to the outside of at least a portion of the low electrical resistance metal.

1391. The heater of claim 1390, wherein the protective sheath comprises a second ferromagnetic material.

1392. The heater of claim 1390, wherein the protective sheath comprises a second ferromagnetic material, and wherein the second ferromagnetic material has a Curie temperature above the selected temperature.

1393. The heater of claim 1365, further comprising an electrically conductive lining placed on the inside of a portion of the conduit in an overburden section of a subsurface formation.

1394. The heater of claim 1365, further comprising a copper lining placed on the inside of a portion of the conduit in an overburden section of a subsurface formation.

1395. The heater of claim 1365, wherein the ferromagnetic material is configured to inherently provide the reduced heat output above or near the selected temperature that is about 20% or less of the heat output at about 50 °C below the selected temperature.

1396. The heater of claim 1365, further comprising a deformation resistant container, wherein at least a portion of the system is located in the deformation resistant container, and wherein the selected temperature is selected such that the deformation resistant container has a creep-rupture strength of at least about 3000 psi at 100,000 hours at the selected temperature.

1397. The heater of claim 1365, wherein the deformation resistant container comprises an alloy, and the alloy comprises iron, chromium, nickel, manganese, carbon, and tantalum.

1398. A system configured to heat at least a part of a subsurface formation, comprising:

one or more electrical conductors configured to be placed in an opening in the formation, wherein at least one electrical conductor comprises at least one electrically resistive portion configured to provide a heat output when alternating current is applied through such electrically resistive portion, and wherein at least one of such electrically resistive portions comprises one or more ferromagnetic materials, and is configured, when above or near a selected temperature and when alternating current is applied, to inherently provide a reduced heat output;

a combustion heater placed in the opening in the formation; and

wherein the system is configured to allow heat to transfer from at least one of the electrically resistive portions to at least a part of the formation.

1399. The system of claim 1398, wherein the combustion heater comprises a natural distributed combustor.

1400. The system of claim 1398, wherein the combustion heater comprises a flameless distributed combustor.

1401. The system of claim 1398, wherein at least one electrical conductor is configured to provide heat to maintain combustion in the combustion heater during use.

1402. The system of claim 1398, wherein the subsurface formation comprises a hydrocarbon containing formation.

1403. The system of claim 1398, wherein the subsurface formation comprises a hydrocarbon containing formation, and wherein the system is configured to pyrolyze at least some hydrocarbons in the formation.

1404. The system of claim 1398, wherein the subsurface formation comprises contaminated soil.

1405. The system of claim 1398, wherein the subsurface formation comprises contaminated soil, and wherein the system is configured to remediate at least a portion of the contaminated soil.

1406. The system of claim 1398, wherein the system is configured to provide heat to at least a portion of the opening in the formation.

1407. The system of claim 1398, wherein at least one of the electrically resistive portions is configured to provide heat to ignite at least part of the combustion heater.

1408. The system of claim 1398, wherein at least one of the electrically resistive portions is configured to be an ignition source for at least part of the combustion heater.

1409. The system of claim 1398, wherein the system is configured such that at least one electrically resistive portion maintains a minimum temperature of the system above an auto-ignition temperature of a combustion mixture being provided to at least part of the combustion heater.

1410. A heater for a subsurface formation, comprising:

an electrical conductor configured to generate a heat output during application of alternating electrical current to the electrical conductor;

wherein the electrical conductor comprises a ferromagnetic material, wherein the ferromagnetic material provides, when alternating current is applied to it, a reduced heat output above or near a selected temperature, and wherein the ferromagnetic material comprises a turndown ratio of at least 2:1; and

wherein the heater is configured to heat at least a part of a subsurface formation.

1411. The heater of claim 1410, wherein the amount of current applied to the electrical conductor is at least about 70 amps.

1412. The heater of claim 1410, wherein the ferromagnetic material has a thickness greater than a skin depth of the alternating current at the Curie temperature of the ferromagnetic material.

1413. The heater of claim 1410, wherein the heat output below the selected temperature is configured to be increased by decreasing the amount of current applied to the electrical conductor.

1414. The heater of claim 1410, wherein the heat output below the selected temperature is configured to be decreased by increasing the amount of current applied to the electrical conductor.

1415. The heater of claim 1410, wherein the heater is configured to provide heat to a subsurface formation.

1416. The heater of claim 1410, wherein the heater is configured to provide heat to a hydrocarbon containing formation, and wherein the system is configured to pyrolyze at least some hydrocarbons in the formation.

1417. The heater of claim 1410, wherein the heater is configured to provide heat to contaminated soil, and wherein the system is configured to remediate at least a portion of the contaminated soil.

1418. The heater of claim 1410, wherein the heater is configured to provide heat to at least a portion of an opening in a subsurface formation.

1419. The heater of claim 1410, further comprising at least one additional electrical conductor.

1420. The heater of claim 1410, further comprising at least one additional electrical conductor and an electrically insulating material placed between the electrical conductor and at least one additional electrical conductor.

1421. The heater of claim 1410, wherein a resistance of the ferromagnetic material decreases above a selected temperature of the ferromagnetic material such that the heater provides the reduced heat output above the selected temperature.

1422. The heater of claim 1410, further comprising a higher conductivity non-ferromagnetic material coupled to the ferromagnetic material.

1423. The heater of claim 1410, further comprising a second ferromagnetic material coupled to the ferromagnetic material.

1424. The heater of claim 1410, wherein the selected temperature is approximately the Curie temperature of the ferromagnetic material.

1425. The heater of claim 1410, wherein the reduced heat output is less than about 400 watts per meter.

1426. The heater of claim 1410, wherein the heat output is greater than about 400 watts per meter below the selected temperature.

1427. The heater of claim 1410, wherein the heater is greater than about 10 m in length.

1428. The heater of claim 1410, wherein the ferromagnetic material comprises a turndown ratio of at least about 3 to 1.

1429. The heater of claim 1410, wherein the ferromagnetic material comprises a turndown ratio of at least about 5 to 1.

1430. The heater of claim 1410, wherein the heater comprises an outside diameter of less than about 5 cm.

1431. A heater for a subsurface formation, comprising:

at least one section comprising a first electrical conductor configured to generate a heat output during application of an alternating electrical current to the first electrical conductor;

wherein the first electrical conductor comprises a ferromagnetic material, and the heater provides, when an alternating current is applied to it, a reduced heat output above or near a selected temperature;

at least one section comprising a second electrical conductor, wherein the second electrical conductor comprises a highly electrically conductive material, wherein at least a portion of the first electrical conductor is electrically coupled to at least a portion of the second electrical conductor such that a majority of the electrical current does not flow through the second electrical conductor below the selected temperature, and such that, at the selected temperature, a majority of the electrical current flows through the second electrical conductor; and

wherein the heater is configured to heat at least part of a subsurface formation.

1432. The heater of claim 1431, wherein at least one section comprising the first electrical conductor is electrically coupled to at least one section comprising the second electrical conductor.

1433. The heater of claim 1431, wherein at least one section comprising the first electrical conductor is coupled between at least two sections comprising the second electrical conductor.

1434. The heater of claim 1431, wherein at least one section comprising the second electrical conductor is coupled between at least two sections comprising the first electrical conductor.

1435. The heater of claim 1431, wherein at least one section comprising the first electrical conductor is located proximate a portion of a subsurface formation selected for heating.

1436. The heater of claim 1431, wherein at least one section comprising the second electrical conductor is located proximate a portion of a subsurface formation selected to not be heated.

1437. The heater of claim 1431, wherein the second electrical conductor comprises copper.

1438. The heater of claim 1431, wherein the amount of current applied to the first electrical conductor is at least about 70 amps.

1439. The heater of claim 1431, wherein the ferromagnetic material has a thickness greater than a skin depth of the alternating current at the Curie temperature of the ferromagnetic material.

1440. The heater of claim 1431, wherein the heat output below the selected temperature is configured to be increased by decreasing the amount of current applied to the first electrical conductor.

1441. The heater of claim 1431, wherein the heat output below the selected temperature is configured to be decreased by increasing the amount of current applied to the first electrical conductor.

1442. The heater of claim 1431, wherein the heater is configured to provide heat to a subsurface formation.

1443. The heater of claim 1431, wherein the heater is configured to provide heat to a hydrocarbon containing formation, and wherein the system is configured to pyrolyze at least some hydrocarbons in the formation.

1444. The heater of claim 1431, wherein the heater is configured to provide heat to contaminated soil, and wherein the system is configured to remediate at least a portion of the contaminated soil.

1445. The heater of claim 1431, wherein the heater is configured to provide heat to at least a portion of an opening in a subsurface formation.

1446. The heater of claim 1431, further comprising at least one additional electrical conductor coupled to the first electrical conductor.

1447. The heater of claim 1431, further comprising at least one additional electrical conductor coupled to the first electrical conductor and an electrically insulating material placed between the first electrical conductor and at least one additional electrical conductor.

1448. The heater of claim 1431, wherein a resistance of the ferromagnetic material decreases above a selected temperature of the ferromagnetic material such that the heater provides the reduced heat output above the selected temperature.

1449. The heater of claim 1431, further comprising a higher conductivity non-ferromagnetic material coupled to the ferromagnetic material.

1450. The heater of claim 1431, further comprising a second ferromagnetic material coupled to the ferromagnetic material.

1451. The heater of claim 1431, wherein the selected temperature is approximately the Curie temperature of the ferromagnetic material.

1452. The heater of claim 1431, wherein the reduced heat output is less than about 400 watts per meter.

1453. The heater of claim 1431, wherein the heat output is greater than about 400 watts per meter below the selected temperature.

1454. The heater of claim 1431, wherein the heater is greater than about 10 m in length.

1455. The heater of claim 1431, wherein the ferromagnetic material comprises a turndown ratio of at least about 2 to 1.

1456. The heater of claim 1431, wherein the heater comprises an outside diameter of less than about 5 cm.

1457. A heater for a subsurface formation, comprising:

a first elongated electrical conductor configured to generate a heat output during application of an alternating electrical current to the first electrical conductor, wherein the first electrical conductor comprises a ferromagnetic material, and the first elongated electrical conductor provides, when an alternating current is applied to it, a reduced heat output above or near a selected temperature;

a second elongated electrical conductor comprising a highly electrically conductive material, wherein at least a significant length of the first electrical conductor is electrically coupled to the second electrical conductor; and

wherein the heater is configured to heat at least part of a subsurface formation.

1458. The heater of claim 1457, wherein the second elongated electrical conductor comprises copper.

1459. The heater of claim 1457, wherein the amount of current applied to the first elongated electrical conductor is at least about 70 amps.

1460. The heater of claim 1457, wherein the ferromagnetic material has a thickness greater than a skin depth of the alternating current at the Curie temperature of the ferromagnetic material.

1461. The heater of claim 1457, wherein the heat output below the selected temperature is configured to be increased by decreasing the amount of current applied to the first elongated electrical conductor.

1462. The heater of claim 1457, wherein the heat output below the selected temperature is configured to be decreased by increasing the amount of current applied to the first elongated electrical conductor.

1463. The heater of claim 1457, wherein the heater is configured to provide heat to a subsurface formation.

1464. The heater of claim 1457, wherein the heater is configured to provide heat to a hydrocarbon containing formation, and wherein the system is configured to pyrolyze at least some hydrocarbons in the formation.

1465. The heater of claim 1457, wherein the heater is configured to provide heat to contaminated soil, and wherein the system is configured to remediate at least a portion of the contaminated soil.

1466. The heater of claim 1457, wherein the heater is configured to provide heat to at least a portion of an opening in a subsurface formation.

1467. The heater of claim 1457, further comprising at least one additional electrical conductor coupled to the first elongated electrical conductor.

1468. The heater of claim 1457, further comprising at least one additional electrical conductor coupled to the first elongated electrical conductor and an electrically insulating material placed between the first elongated electrical conductor and at least one additional electrical conductor.

1469. The heater of claim 1457, wherein a resistance of the ferromagnetic material decreases above a selected temperature of the ferromagnetic material such that the heater provides the reduced heat output above the selected temperature.

1470. The heater of claim 1457, further comprising a higher conductivity non-ferromagnetic material coupled to the ferromagnetic material.

1471. The heater of claim 1457, further comprising a second ferromagnetic material coupled to the ferromagnetic material.

1472. The heater of claim 1457, wherein the selected temperature is approximately the Curie temperature of the ferromagnetic material.

1473. The heater of claim 1457, wherein the reduced heat output is less than about 400 watts per meter.

1474. The heater of claim 1457, wherein the heat output is greater than about 400 watts per meter below the selected temperature.

1475. The heater of claim 1457, wherein the heater is greater than about 10 m in length.

1476. The heater of claim 1457, wherein the ferromagnetic material comprises a turndown ratio of at least about 2 to 1.

1477. The heater of claim 1457, wherein the heater comprises an outside diameter of less than about 5 cm.

1478. The heater of claim 1457, wherein the first elongated electrical conductor and the second elongated electrical conductor are electrically coupled such that a majority of the electrical current does not flow through the second elongated electrical conductor below the selected

temperature, and such that, near or above the selected temperature, a majority of the electrical current flows through the second elongated electrical conductor.

1479. A method for heating fluids in a wellbore, comprising:

applying alternating electrical current to one or more electrical conductors placed in a wellbore, wherein at least one electrical conductor comprises one or more electrically resistive portions; and

providing heat from at least one electrically resistive portion to fluids in the wellbore, wherein at least one of such electrically resistive portions is configured, when above or near a selected temperature, to inherently provide a reduced heat output.

1480. The method of claim 1479, further comprising producing fluids through the opening in the formation.

1481. The method of claim 1480, wherein the produced fluids comprise at least some hydrocarbons from the formation.

1482. The method of claim 1480, wherein the produced fluids comprise at least some pyrolyzed hydrocarbons from the formation.

1483. The method of claim 1479, further comprising providing a relatively constant heat output in a temperature range between about 300 °C and 600 °C.

1484. The method of claim 1479, further comprising providing a relatively constant heat output in a temperature range between about 100 °C and 750 °C.

1485. The method of claim 1479, wherein at least one electrically conductive portion comprises a resistance that decreases above the selected temperature such that the electrically conductive portion provides the reduced heat output above the selected temperature.

1486. The method of claim 1479, wherein at least one electrically conductive portion comprises ferromagnetic material with a thickness greater than about ¾ of a skin depth of the alternating current at the Curie temperature of the ferromagnetic material.

1487. The method of claim 1479, wherein at least one electrically conductive portion comprises ferromagnetic material.

1488. The method of claim 1479, further comprising allowing heat to transfer from the wellbore to at least a part of a hydrocarbon containing formation, and pyrolyzing at least some hydrocarbons in the hydrocarbon containing formation.

1489. The method of claim 1479, wherein the reduced heat output is less than about 400 watts per meter.

1490. The method of claim 1479, wherein the heat output is greater than about 400 watts per meter below the selected temperature.

1491. The method of claim 1479, further comprising controlling a skin depth in at least one electrically resistive portion by controlling a frequency of alternating current applied to at least one electrically resistive portion.

1492. The method of claim 1479, further comprising applying additional power to at least one electrically resistive portion as the temperature of the electrically resistive portion increases, and continuing to do so until the temperature is at or near the selected temperature.

1493. The method of claim 1479, wherein the amount of heat output provided from at least one electrically resistive portion is determined by the amount of current applied to such electrically resistive portion.

1494. The method of claim 1479, further comprising controlling the amount of current applied to at least one electrically resistive portion to control the amount of heat provided by such electrically resistive portion.

1495. The method of claim 1479, further comprising increasing the amount of current applied to at least one electrically resistive portion to decrease the amount of heat provided by such electrically resistive portion.

1496. The method of claim 1479, further comprising decreasing the amount of current applied to at least one electrically resistive portion to increase the amount of heat provided by such electrically resistive portion.

1497. The method of claim 1479, further comprising applying at least about 70 amps of current to at least one electrically resistive portion.

1498. A system configured to insulate an overburden of at least a part of a hydrocarbon containing formation, comprising:

an opening in a part of the formation;

a first conduit located in the opening;

an insulating material located between the first conduit and the overburden;

a second conduit located inside the first conduit with an annular region between the first and second conduits; and

at least one baffle in the annular region.

1499. The system of claim 1498, wherein the insulating material is cement.

1500. The system of claim 1498, wherein the insulting material is foamed cement.

1501. The system of claim 1500, wherein the cement is foamed with nitrogen.

1502. The system of claim 1498, wherein the first conduit extends through the overburden of the formation.

1503. The system of claim 1498, wherein at least one baffle is positioned at a bottom of the first conduit and seals the annular region.

1504. The system of claim 1498, wherein a pressure in the annular region is maintained below about 1 bar.

1505. The system of claim 1498, further comprising a gas placed in the annular region.

1506. The system of claim 1505, wherein the gas comprises air.

1507. The system of claim 1505, wherein the gas comprises nitrogen.

1508. A method whereby heat transfer between an overburden of at least a part of a hydrocarbon containing formation and a conduit positioned in an opening in a part of the formation is decreased, comprising:

locating an insulating material between a first conduit and the overburden;

locating a second conduit inside the first conduit and forming an annular region between the first and second conduits; and

positioning at least one baffle in the annular region.

1509. The method of claim 1508, wherein the insulating material is cement.

1510. The method of claim 1508, wherein the insulting material is foamed cement.

1511. The method of claim 1510, wherein the foamed cement is foamed with nitrogen.

1512. The method of claim 1508, wherein the first conduit extends through the overburden.

1513. The method of claim 1508, further comprising sealing the annular region with at least one baffle positioned at a bottom of the first conduit.

1514. The method of claim 1508, further comprising maintaining a pressure in the annular region below about 1 bar.

1515. The method of claim 1508, further comprising providing a gas to the annular region.

1516. The method of claim 1515, wherein the gas comprises air.

1517. The method of claim 1515, wherein the gas comprises nitrogen.

1518. A system configured to reduce a temperature of at least a part of a hydrocarbon containing formation, comprising:

an opening in a part of the formation;

a first conduit located in the opening;

a second conduit located inside the first conduit with an annular region between the first and second conduits;

a third conduit located inside the second conduit;

at least one baffle located in the annular region; and

at least one refrigerant configured to be provided through the second and third conduits.

1519. The system of claim 1518, wherein the first conduit extends through an overburden section.

1520. The system of claim 1518, wherein the baffle is positioned at a bottom of the first conduit and seals the annular region.

1521. The system of claim 1518, wherein the annular region contains a gas.

1522. The system of claim 1521, wherein the gas comprises air.

1523. The system of claim 1521, wherein the gas comprises nitrogen.

1524. The system of claim 1518, wherein a pressure in the annular region is maintained below 1 bar.

1525. The system of claim 1518, wherein the first conduit is fixed in place with cement.

1526. The system of claim 1518, wherein the first conduit is fixed in place with foamed cement.

1527. The system of claim 1526, wherein the foamed cement comprises cement foamed with nitrogen.

1528. A method configured to reduce the temperature of at least a part of a hydrocarbon containing formation, comprising:

locating a first conduit in an opening in a part of the formation;
positioning a second conduit inside the first conduit;
positioning a third conduit inside the second conduit;
providing an annular region between the first and second conduits;
positioning a baffle in the annular region; and
providing refrigerant to the second conduit.

1529. The system of claim 1528, wherein the first conduit extends through an overburden section.

1530. The system of claim 1528, wherein the baffle is positioned at a bottom of the first conduit and seals the annular region.

1531. The system of claim 1528, wherein the annular region contains a gas.

1532. The system of claim 1531, wherein the gas comprises air.

1533. The system of claim 1531, wherein the gas comprises nitrogen.

1534. The system of claim 1528, wherein a pressure in the annular region is maintained below 1 bar.

1535. The system of claim 1528, wherein the first conduit is fixed in place with cement.

1536. The system of claim 1528, wherein the first conduit is fixed in place with foamed cement.

1537. The system of claim 1536, wherein the foamed cement comprises cement foamed with nitrogen.

1538. The system of claim 1528, wherein the refrigerant exits a bottom of the second conduit, enters a bottom of the third conduit, and exits a top of the third conduit.

1539. A method of treating a hydrocarbon containing formation, comprising:

providing a first barrier to a first portion of the formation, wherein the first portion comprises methane;

removing water from the first portion;

producing fluids from the first portion, wherein produced fluids from the first portion comprise methane;

providing a second barrier to a second portion of the formation, wherein the second portion comprises methane;

removing water from the second portion, and then transferring at least a portion of such water to the first portion; and

producing fluids from the second portion, wherein produced fluids from the second portion comprise methane.

1540. A method of treating a hydrocarbon containing formation, comprising:

providing a first barrier to a first portion of the formation;

removing water from the first portion;

providing a second barrier to a second portion of the formation, wherein the second portion comprises methane;

removing water from the second portion, and then transferring at least a portion of such water to the first portion; and

producing fluids from the second portion, wherein produced fluids comprise methane.

1541. The method of claim 1540, wherein the first and second portions are substantially adjacent each other.

1542. The method of claim 1540, wherein providing a first barrier comprises:

providing refrigerant to a plurality of freeze wells to form a low temperature zone around the first portion; and

lowering a temperature within the low temperature zone to a temperature less than about a freezing temperature of water.

1543. The method of claim 1540, wherein providing a second barrier comprises:

providing refrigerant to a plurality of freeze wells to form a low temperature zone around the second portion; and

lowering a temperature within the low temperature zone to a temperature less than about a freezing temperature of water.

1544. The method of claim 1540, wherein providing a first barrier comprises providing refrigerant to a plurality of freeze wells to form a frozen barrier zone and wherein the frozen barrier zone at least partially inhibits fluids from flowing into or out of the portion.

1545. The method of claim 1540, wherein providing a second barrier comprises providing refrigerant to a plurality of freeze wells to form a frozen barrier zone and wherein the frozen barrier zone at least partially inhibits fluids from flowing into or out of the portion.

1546. The method of claim 1540, further comprising:

providing heat from one or more heaters to at least one portion of the formation; and

allowing the heat to transfer from at least one of the heaters to a part of the formation.

1547. The method of claim 1540, wherein an average temperature of at least one portion of the formation is less than about a boiling point of water at formation conditions.

1548. The method of claim 1540, wherein an average temperature of at least one portion of the formation is less than about 100 °C.

1549. A method of recovering methane from a hydrocarbon containing formation, comprising:

providing a barrier to a first portion of the formation, wherein the first portion comprises methane;

removing water from the first portion and then transferring at least a portion of such water to a second portion of the formation; and

producing fluids from the first portion, wherein the produced fluids comprise methane.

1550. The method of claim 1549, wherein providing a barrier comprises:

providing refrigerant to a plurality of freeze wells to form a low temperature zone around the portion; and

lowering a temperature within the low temperature zone to a temperature less than about a freezing temperature of water.

1551. The method of claim 1549, wherein providing a barrier comprises providing refrigerant to a plurality of freeze wells to form a frozen barrier zone and wherein the frozen barrier zone at least partially inhibits fluids from flowing into or out of the portion.

1552. The method of claim 1549, further comprising:

providing heat from one or more heaters to at least one portion of the formation; and

allowing the heat to transfer from at least one of the heaters to a part of the formation.

1553. The method of claim 1549, wherein an average temperature of at least one portion of the formation is less than about a boiling point of water at formation conditions.

1554. The method of claim 1549, wherein an average temperature of at least one portion of the formation is less than about 100 °C.

1555. A method of treating a hydrocarbon containing formation, comprising:

assessing a thickness of a portion of the formation to be treated, wherein such portion comprises methane;

using such thickness to determine a number of barrier wells to provide to the portion of the formation;

providing a plurality of barrier wells to the portion of the formation;

removing water from a portion of the formation; and

producing fluids from a portion of the formation, wherein the produced fluids comprise methane.

1556. The method of claim 1555, wherein providing at least one barrier comprises:

providing refrigerant to a plurality of freeze wells to form a low temperature zone around the portion; and

lowering a temperature within the low temperature zone to a temperature less than about a freezing temperature of water.

1557. The method of claim 1555, wherein providing at least one barrier comprises providing refrigerant to a plurality of freeze wells to form a frozen barrier zone and wherein the frozen barrier zone at least partially inhibits fluids from flowing into or out of the portion.

1558. The method of claim 1555, further comprising:

providing heat from one or more heaters to at least one portion of the formation; and

allowing the heat to transfer from at least one of the heaters to a part of the formation.

1559. The method of claim 1555, wherein an average temperature of at least one portion of the formation is less than about a boiling point of water at formation conditions.

1560. The method of claim 1555, wherein an average temperature of at least one portion of the formation is less than about 100 °C.

1561. A method of treating a hydrocarbon containing formation, comprising:

providing a first barrier to a first portion of the formation, wherein the first portion comprises methane;

providing a second barrier to a second portion of the formation, wherein at least a part of the first portion is positioned substantially between the second portion and a surface of the formation;

removing water from the first portion;

producing fluids from the first portion, wherein produced fluids from the first portion comprise methane;

removing water from the second portion of the formation, and then transferring at least a portion of such water to the first portion of the formation; and

producing fluids from the second portion, wherein produced fluids from the second portion comprise methane.

1562. The method of claim 1561, wherein providing the first barrier comprises providing refrigerant to a plurality of freeze wells to form a frozen barrier zone and wherein the frozen barrier zone at least partially inhibits fluids from flowing into or out of the portion.

1563. The method of claim 1561, further comprising:

providing heat from one or more heaters to at least one portion of the formation; and

allowing the heat to transfer from at least one of the heaters to a part of the formation.

1564. The method of claim 1561, wherein an average temperature of at least one portion of the formation is less than about a boiling point of water at formation conditions.

1565. The method of claim 1561, wherein an average temperature of at least one portion of the formation is less than about 100 °C.

1566. A method of in situ sequestration of carbon dioxide within a hydrocarbon containing formation, comprising:

storing carbon dioxide within at least one portion of the formation, wherein at least some methane has been produced from the portion of the formation prior to storing the carbon dioxide within the portion of the formation, and wherein the portion of the formation has been at least partially isolated from other subsurface areas using a barrier wall.

1567. The method of claim 1566, wherein water has been removed from the portion of the formation after the barrier wall was in place.

1568. The method of claim 1566, wherein the carbon dioxide is stored within a spent portion of the formation.

1569. The method of claim 1568, wherein the spent portion of the formation comprises hydrocarbon containing material within a section of the formation that has been heated and from which condensable hydrocarbons have been produced, and wherein the spent portion of the formation is at a temperature at which carbon dioxide adsorbs onto the hydrocarbon containing material.

1570. The method of claim 1566, further comprising raising a water level within the portion to inhibit migration of the carbon dioxide from the portion.

1571. The method of claim 1566, further comprising using the carbon dioxide to displace methane.

1572. The method of claim 1566, wherein the portion of the formation is more than about 760 m below ground surface.

1573. The method of claim 1566, further comprising adsorbing a portion of the carbon dioxide within the portion.

1574. A method of in situ sequestration of carbon dioxide within a hydrocarbon containing formation, comprising:

producing fluids from at least a portion of the formation, wherein produced fluids comprise methane, and wherein the portion of the formation has been at least partially isolated from other subsurface areas using a barrier wall; and

storing carbon dioxide within the portion.

1575. The method of claim 1574, wherein water has been removed from the portion of the formation after the barrier wall was in place.

1576. The method of claim 1574, wherein the carbon dioxide is stored within a spent portion of the formation.

1577. The method of claim 1575, wherein the spent portion of the formation comprises hydrocarbon containing material within a section of the formation that has been heated and from which condensable hydrocarbons have been produced, and wherein the spent portion of the formation is at a temperature at which carbon dioxide adsorbs onto the hydrocarbon containing material.

1578. The method of claim 1574, further comprising raising a water level within the portion to inhibit migration of the carbon dioxide from the portion.

1579. The method of claim 1574, further comprising using the carbon dioxide to displace methane.

1580. The method of claim 1574, wherein the portion of the formation is more than about 760 m below ground surface.

1581. The method of claim 1574, further comprising adsorbing a portion of the carbon dioxide within the portion.

1582. The method of claim 1574, wherein producing fluids from the formation comprises removing pyrolyzation products from the formation.

1583. The method of claim 1574, wherein producing fluids from the formation comprises heating a portion of the formation to a temperature sufficient to generate synthesis gas; introducing a synthesis gas generating fluid into the part of the formation; and removing synthesis gas from the formation.

1584. A method of in situ sequestration of carbon dioxide within a hydrocarbon containing formation, comprising:

providing heat from one or more heaters to at least one portion of the formation, wherein the portion comprises methane, and wherein the portion of the formation has been at least partially isolated from other subsurface areas using a barrier wall;

allowing the heat to transfer from the one or more heaters to a part of the formation;

producing fluids from the formation, wherein produced fluids comprise methane;

allowing the portion to cool; and

storing carbon dioxide within the portion.

1585. The method of claim 1584, wherein water has been removed from the portion of the formation after the barrier wall was in place.

1586. The method of claim 1584, wherein the one or more heaters comprise at least two heaters, and wherein superposition of heat from at least the two heaters pyrolyzes at least some hydrocarbons within the part of the formation.

1587. The method of claim 1584, wherein the carbon dioxide is stored within a spent portion of the formation.

1588. The method of claim 1587, wherein the spent portion of the formation comprises hydrocarbon containing material within a section of the formation that has been heated and from which condensable hydrocarbons have been produced, and wherein the spent portion of the formation is at a temperature at which carbon dioxide adsorbs onto the hydrocarbon containing material.

1589. The method of claim 1587, wherein the spent portion of the formation comprises a substantially uniform permeability created by heating the spent formation and removing fluid during formation of the spent portion.

1590. The method of claim 1584, further comprising raising a water level within the portion to inhibit migration of the carbon dioxide from the portion.

1591. The method of claim 1584, further comprising using the carbon dioxide to displace methane.

1592. The method of claim 1584, wherein the portion of the formation is more than about 750 m below ground surface.

1593. The method of claim 1584, further comprising adsorbing a portion of the carbon dioxide within the portion.

1594. The method of claim 1584, wherein producing fluids from the formation comprises removing pyrolyzation products from the formation.

1595. The method of claim 1584, wherein heating the part of the formation comprises introducing an oxidizing fluid into the part of the formation, reacting the oxidizing fluid within the part of the formation to heat the part of the formation.

1596. The method of claim 1584, wherein heating the part of the formation comprises:

heating hydrocarbon containing material adjacent to one or more wellbores to a temperature sufficient to support oxidation of the hydrocarbon containing material with an oxidant;

introducing the oxidant to hydrocarbon containing material adjacent to one or more wellbores to oxidize hydrocarbons and produce heat; and

conveying produced heat to the portion.

1597. The method of claim 1584, wherein at least one of the heaters comprises an electrical heater.

1598. The method of claim 1584, wherein at least one of the heaters comprises a flameless distributed combustor.

1599. The method of claim 1598, wherein a portion of fuel for one or more flameless distributed combustors is obtained from the formation.

1600. The method of claim 1584, wherein at least one of the heaters comprises a heater well in the formation through which heat transfer fluid is circulated.

1601. The method of claim 1600, wherein the heat transfer fluid comprises combustion products.

1602. The method of claim 1600, wherein the heat transfer fluid comprises steam.

1603. The method of claim 1584, further comprising:

producing condensable hydrocarbons under pressure; and

generating electricity by passing a portion of the produced fluids through a turbine.

1604. The method of claim 1584, further comprising providing heat from three or more heaters to at least a portion of the formation, wherein three or more of the heaters are located in the formation in a unit of heaters, and wherein the unit of heaters comprises a triangular pattern.

1605. The method of claim 1584, further comprising providing heat from three or more heaters to at least a portion of the formation, wherein three or more of the heaters are located in the formation in a unit of heaters, wherein the unit of heaters comprises a triangular pattern, and wherein a plurality of the units of heaters are repeated over an area of the formation to form a repetitive pattern of units.

1606. A method of treating a hydrocarbon containing formation in situ, comprising:

providing heat from one or more heaters to at least one portion of the formation, wherein the formation comprises sub-bituminous coal;

allowing the heat to transfer from the one or more heaters to a part of the formation;

providing H_2 to the part of the formation; and

producing fluids from the formation.

1607. The method of claim 1606, wherein a portion of the formation comprises methane.

1608. The method of claim 1606, wherein the sub-bituminous coal has a vitrinite reflectance of less than about 0.5%.

1609. The method of claim 1606, wherein produced fluids comprise methane.

1610. The method of claim 1606, wherein one or more heaters comprise at least two heaters, and wherein superposition of heat from at least two heaters pyrolyzes at least some hydrocarbons within the part of the formation.

1611. The method of claim 1606, further comprising maintaining a temperature within the part of the formation within a pyrolysis temperature range.

1612. The method of claim 1606, wherein at least one of the heaters comprises an electrical heater.

1613. The method of claim 1606, wherein at least one of the heaters comprises a surface burner.

1614. The method of claim 1606, wherein at least one of the heaters comprises a flameless distributed combustor.

1615. The method of claim 1606, wherein at least one of the heaters comprises a natural distributed combustor.

1616. The method of claim 1606, further comprising controlling a pressure and a temperature within at least a majority of the part of the formation, wherein the pressure is controlled as a function of temperature, or the temperature is controlled as a function of pressure.

1617. The method of claim 1606, further comprising controlling the heat such that an average heating rate of the part of the formation is less than about 1 °C per day during pyrolysis.

1618. The method of claim 1606, wherein providing heat from the one or more heaters to at least a portion of formation comprises:

heating a selected volume (V) of the hydrocarbon containing formation from the one or more heaters, wherein the formation has an average heat capacity (C_v), and wherein the heating pyrolyzes at least some hydrocarbons within the selected volume of the formation; and

wherein heating energy/day (Pwr) provided to the selected volume is equal to or less than $h*V*C_v\rho_B$, wherein ρ_B is formation bulk density, and wherein an average heating rate (h) of the selected volume is about 10 °C/day.

1619. The method of claim 1606, wherein allowing the heat to transfer comprises transferring heat substantially by conduction.

1620. The method of claim 1606, wherein providing heat from the one or more heaters comprises heating the part of the formation such that a thermal conductivity of at least a portion of the part of the formation is greater than about 0.5 W/(m °C).

1621. The method of claim 1606, further comprising producing a mixture comprising condensable hydrocarbons having an API gravity of at least about 25°.

1622. The method of claim 1606, further comprising producing a mixture comprising condensable hydrocarbons, and wherein about 0.1% by weight to about 15% by weight of the condensable hydrocarbons are olefins.

1623. The method of claim 1606, further comprising producing a mixture comprising non-condensable hydrocarbons, and wherein a molar ratio of ethene to ethane in the non-condensable hydrocarbons ranges from about 0.001 to about 0.15.

1624. The method of claim 1606, further comprising producing a mixture comprising condensable hydrocarbons, and wherein less than about 1% by weight, when calculated on an atomic basis, of the condensable hydrocarbons is nitrogen.

1625. The method of claim 1606, further comprising producing a mixture comprising condensable hydrocarbons, and wherein less than about 1% by weight, when calculated on an atomic basis, of the condensable hydrocarbons is oxygen.

1626. The method of claim 1606, further comprising producing a mixture comprising condensable hydrocarbons, and wherein less than about 1% by weight, when calculated on an atomic basis, of the condensable hydrocarbons is sulfur.

1627. The method of claim 1606, further comprising producing a mixture comprising condensable hydrocarbons, wherein about 5% by weight to about 30% by weight of the condensable hydrocarbons comprise oxygen containing compounds, and wherein the oxygen containing compounds comprise phenols.

1628. The method of claim 1606, further comprising producing a mixture comprising condensable hydrocarbons, and wherein greater than about 20% by weight of the condensable hydrocarbons are aromatic compounds.

1629. The method of claim 1606, further comprising producing a mixture comprising condensable hydrocarbons, and wherein less than about 5% by weight of the condensable hydrocarbons comprises multi-ring aromatics with more than two rings.

1630. The method of claim 1606, further comprising producing a mixture comprising condensable hydrocarbons, and wherein less than about 0.3% by weight of the condensable hydrocarbons are asphaltenes.

1631. The method of claim 1606, further comprising producing a mixture comprising condensable hydrocarbons, and wherein about 5% by weight to about 30% by weight of the condensable hydrocarbons are cycloalkanes.

1632. The method of claim 1606, further comprising producing a mixture comprising a non-condensable component, wherein the non-condensable component comprises hydrogen, wherein the hydrogen is greater than about 10% by volume of the non-condensable component, and wherein the hydrogen is less than about 80% by volume of the non-condensable component.

1633. The method of claim 1606, further comprising producing a mixture comprising ammonia, and wherein greater than about 0.05% by weight of the produced mixture is ammonia.

1634. The method of claim 1606, further comprising producing a mixture comprising ammonia, and wherein the ammonia is used to produce fertilizer.

1635. The method of claim 1606, further comprising controlling a pressure within at least a majority of the part of the formation, wherein the controlled pressure is at least about 2.0 bars absolute.

1636. The method of claim 1606, further comprising controlling formation conditions to produce a mixture, wherein a partial pressure of H_2 within the mixture is greater than about 0.5 bars.

1637. The method of claim 1606, wherein a partial pressure of H_2 within a produced fluid is measured when the produced fluid is at a production well.

1638. The method of claim 1606, further comprising altering a pressure within the formation to inhibit production of hydrocarbons from the formation having carbon numbers greater than about 25.

1639. The method of claim 1606, further comprising:

providing hydrogen (H_2) to a heated section to hydrogenate hydrocarbons within the heated section; and

heating a portion of the section with heat from hydrogenation.

1640. The method of claim 1606, wherein allowing the heat to transfer comprises increasing a permeability of a majority of the part of the formation to greater than about 100 millidarcy.

1641. The method of claim 1606, wherein allowing the heat to transfer comprises substantially uniformly increasing a permeability of a majority of the part of the formation.

1642. The method of claim 1606, further comprising controlling the heat to yield greater than about 60% by weight of condensable hydrocarbons, as measured by the Fischer Assay.

1643. The method of claim 1606, further comprising producing a mixture in a production well, and wherein at least about 7 heaters are disposed in the formation for each production well.

1644. The method of claim 1606, wherein at least about 20 heaters are disposed in the formation for each production well.

1645. The method of claim 1606, further comprising providing heat from three or more heaters to at least a portion of the formation, wherein three or more of the heaters are located in the formation in a unit of heaters, and wherein the unit of heaters comprises a triangular pattern.

1646. The method of claim 1606, further comprising providing heat from three or more heaters to at least a portion of the formation, wherein three or more of the heaters are located in the formation in a unit of heaters, wherein the unit of heaters comprises a triangular pattern, and wherein a plurality of the units are repeated over an area of the formation to form a repetitive pattern of units.

1647. The method of claim 1606, further comprising providing at least one barrier wall to inhibit fluids flowing into or out of the portion.

1648. A method of treating a hydrocarbon containing formation in situ, comprising:

producing fluids from the formation, wherein the produced fluids comprise methane;

separating H_2 from the produced fluids or converting at least some of the produced fluids to H_2; and

providing at least some of the separated or converted H_2 to the portion of the formation.

1649. The method of claim 1648, further comprising controlling a pressure and a temperature within at least a majority of a part of the formation, wherein the pressure is controlled as a function of temperature, or the temperature is controlled as a function of pressure.

1650. The method of claim 1648, further comprising controlling formation conditions to produce the fluids, wherein a partial pressure of H_2 within the fluids is greater than about 0.5 bars.

1651. The method of claim 1648, wherein a partial pressure of H_2 within the fluids is measured when the fluids are at a production well.

1652. The method of claim 1648, further comprising altering a pressure within the formation to inhibit production of hydrocarbons from the formation having carbon numbers greater than about 25.

1653. A method of treating a hydrocarbon containing formation in situ, comprising:

producing fluids from the formation, wherein the produced fluids comprise methane;

separating H_2 from the produced fluids or converting at least some of the produced fluids to H_2;

providing heat from one or more heaters to at least one portion of the formation, wherein the portion comprises methane;

allowing the heat to transfer from the one or more heaters to a part of the formation; and

providing at least some of the separated or converted H_2 to the portion of the formation.

1654. The method of claim 1653, further comprising controlling a pressure and a temperature within at least a majority of a part of the formation, wherein the pressure is controlled as a function of temperature, or the temperature is controlled as a function of pressure.

1655. The method of claim 1653, further comprising controlling formation conditions to produce the fluids, wherein a partial pressure of H_2 within the fluids is greater than about 0.5 bars.

1656. The method of claim 1653, wherein a partial pressure of H_2 within the fluids is measured when the fluids are at a production well.

1657. The method of claim 1653, further comprising altering a pressure within the formation to inhibit production of hydrocarbons from the formation having carbon numbers greater than about 25.

1658. A method of treating a hydrocarbon containing formation in situ, comprising:

providing at least one barrier wall to at least a portion of the formation;

reducing a pressure in the portion of the formation in a controlled manner, wherein the portion of the formation comprises methane; and

producing fluids from the formation, wherein the produced fluids comprise methane.

1659. The method of claim 1658, further comprising:

providing heat from one or more heaters to at least a portion of the formation; and

allowing the heat to transfer from the one or more heaters to a part of the formation.

1660. The method of claim 1658, further comprising reducing the pressure below atmospheric pressure.

1661. The method of claim 1658, wherein reducing the pressure comprises removing water from the portion of the formation.

1662. The method of claim 1661, wherein removing water from the portion of the formation comprises using one or more dewatering wells.

1663. The method of claim 1658, wherein reducing the pressure comprises drawing up to a vacuum.

1664. The method of claim 1658, wherein reducing the pressure comprises drawing a vacuum.

1665. The method of claim 1658, further comprising providing a barrier to a portion of the formation.

1666. The method of claim 1665, wherein providing a barrier comprises:

providing refrigerant to a plurality of freeze wells to form a low temperature zone around the portion; and

lowering a temperature within the low temperature zone to a temperature less than about a freezing temperature of water.

1667. The method of claim 1665, wherein providing a barrier comprises providing refrigerant to a plurality of freeze wells to form a frozen barrier zone and wherein the frozen barrier zone at least partially inhibits fluids from flowing into or out of the portion.

1668. The method of claim 1658, wherein an average temperature of at least one portion of the formation is less than about a boiling point of water at formation conditions.

1669. The method of claim 1658, wherein an average temperature of at least one portion of the formation is less than about 100°C.

1670. The method of claim 1658, further comprising:
providing a barrier to a portion of the formation; and
removing water from the portion.

1671. A method of treating a hydrocarbon containing formation in situ, comprising:
providing a barrier to at least a portion of the formation, wherein the barrier inhibits fluids from flowing into or out of the portion;
removing at least some water from the portion;
reducing a pressure in the portion of the formation, wherein the portion of the formation comprises methane; and
producing fluids from the formation, wherein the produced fluids comprise methane.

1672. The method of claim 1671, further comprising:
providing heat from one or more heaters to at least a portion of the formation; and
allowing the heat to transfer from the one or more heaters to a part of the formation.

1673. The method of claim 1671, further comprising reducing the pressure below atmospheric pressure.

1674. The method of claim 1671, wherein the methane produced is coal bed methane.

1675. The method of claim 1671, wherein removing the water comprises pumping water from the portion of the formation.

1676. The method of claim 1675, wherein removing water from the portion of the formation comprises using one or more dewatering wells.

1677. The method of claim 1671, wherein reducing the pressure comprises drawing a vacuum.

1678. The method of claim 1671, wherein providing a barrier comprises:

providing refrigerant to a plurality of freeze wells to form a low temperature zone around at least a portion of the portion; and

lowering a temperature within the low temperature zone to a temperature less than about a freezing temperature of water.

1679. The method of claim 1671, wherein providing a barrier comprises providing refrigerant to a plurality of freeze wells to form a frozen barrier zone and wherein the frozen barrier zone at least partially inhibits fluids from flowing into or out of the portion.

1680. The method of claim 1671, wherein an average temperature of at least one portion of the formation is less than about a boiling point of water at formation conditions.

1681. The method of claim 1671, wherein an average temperature of at least one portion of the formation is less than about 100 °C.

1682. A method of treating a hydrocarbon containing formation in situ, comprising:

providing a first barrier to a first portion of the formation, wherein the first portion comprises methane;

removing water from the first portion;

producing fluids from the first portion, wherein produced fluids from the first portion comprise methane;

providing a second barrier to a second portion of the formation, wherein the second portion comprises methane;

removing water from the second portion, and then transferring at least a portion of such water to the first portion;

providing carbon dioxide to the second portion of the formation; and

producing fluids from the second portion, wherein produced fluids from the second portion comprise methane.

1683. The method of claim 1682, further comprising providing carbon dioxide to the first portion of the formation.

1684. The method of claim 1683 wherein at least some carbon dioxide provided to the first portion displaces methane.

1685. The method of claim 1682, wherein at least some of the carbon dioxide displaces methane.

1686. The method of claim 1682, wherein providing a first barrier comprises:

providing refrigerant to a plurality of freeze wells to form a low temperature zone around the first portion; and

lowering a temperature within the low temperature zone to a temperature less than about a freezing temperature of water.

1687. The method of claim 1682, wherein providing a second barrier comprises:

providing refrigerant to a plurality of freeze wells to form a low temperature zone around the second portion; and

lowering a temperature within the low temperature zone to a temperature less than about a freezing temperature of water.

1688. The method of claim 1682, wherein providing a first barrier comprises providing refrigerant to a plurality of freeze wells to form a frozen barrier zone and wherein the frozen barrier zone at least partially inhibits fluids from flowing into or out of the portion.

1689. The method of claim 1682, wherein providing a second barrier comprises providing refrigerant to a plurality of freeze wells to form a frozen barrier zone and wherein the frozen barrier zone at least partially inhibits fluids from flowing into or out of the portion.

1690. The method of claim 1682, further comprising:

providing heat from one or more heaters to at least one portion of the formation; and allowing the heat to transfer from at least one of the heaters to a part of the formation.